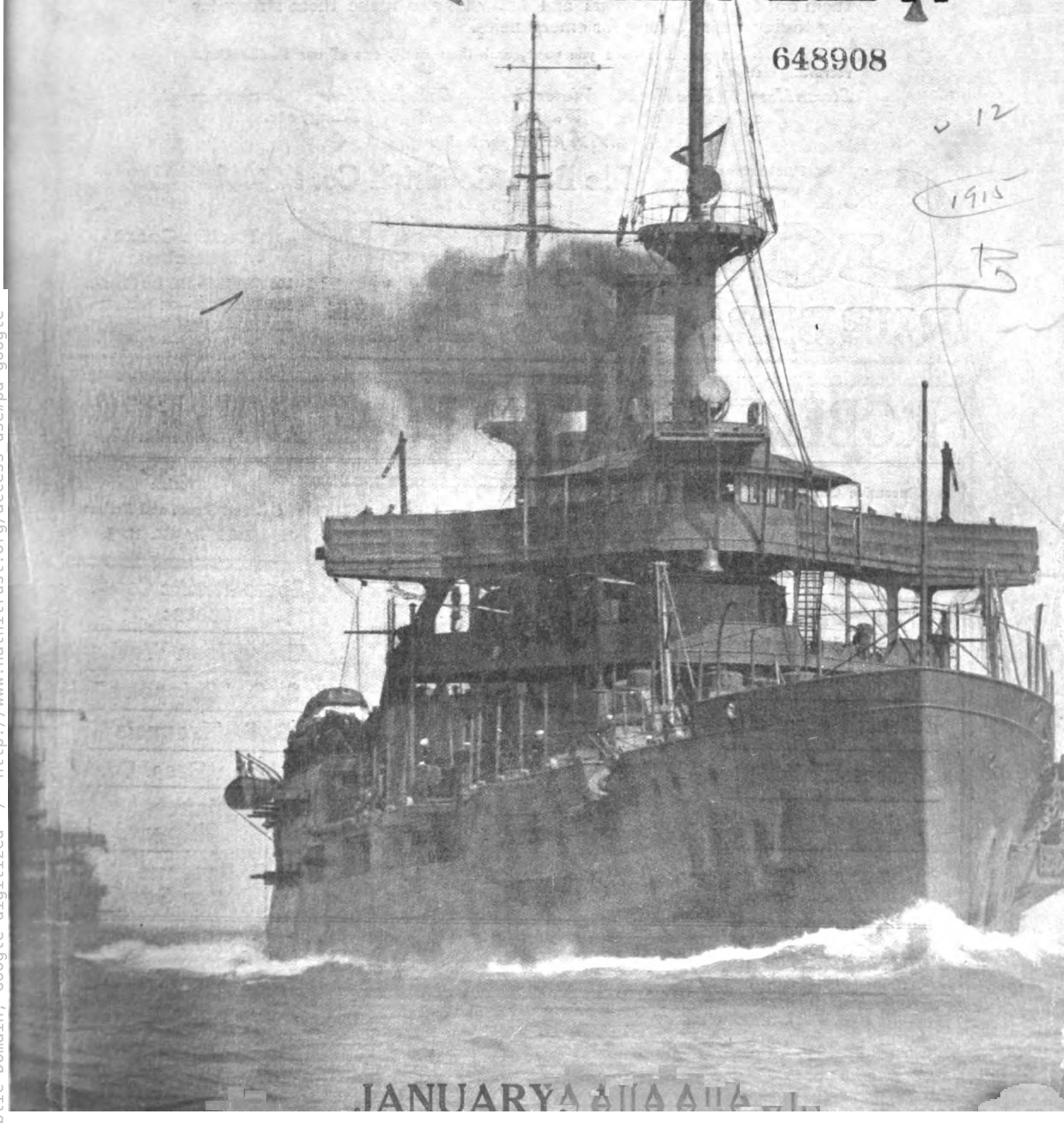
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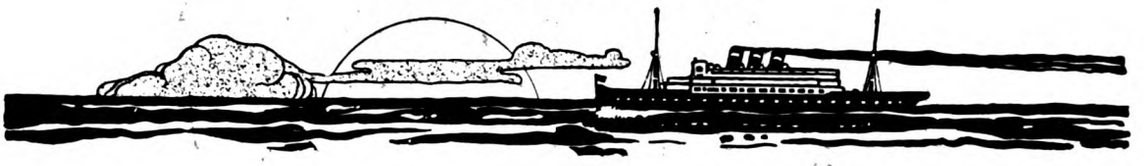
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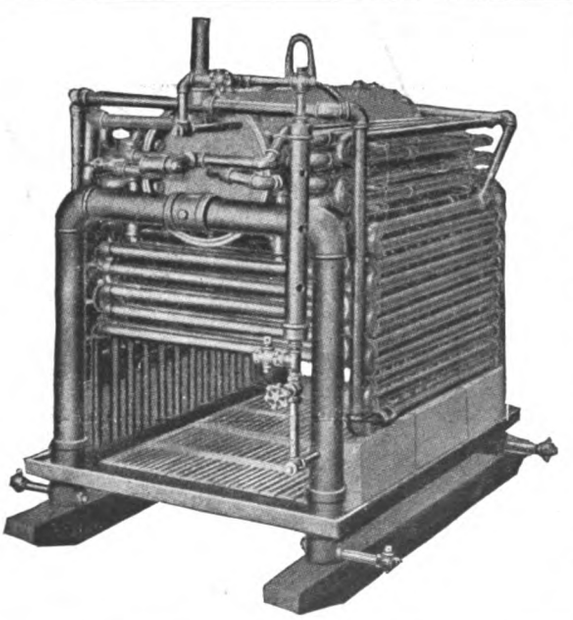
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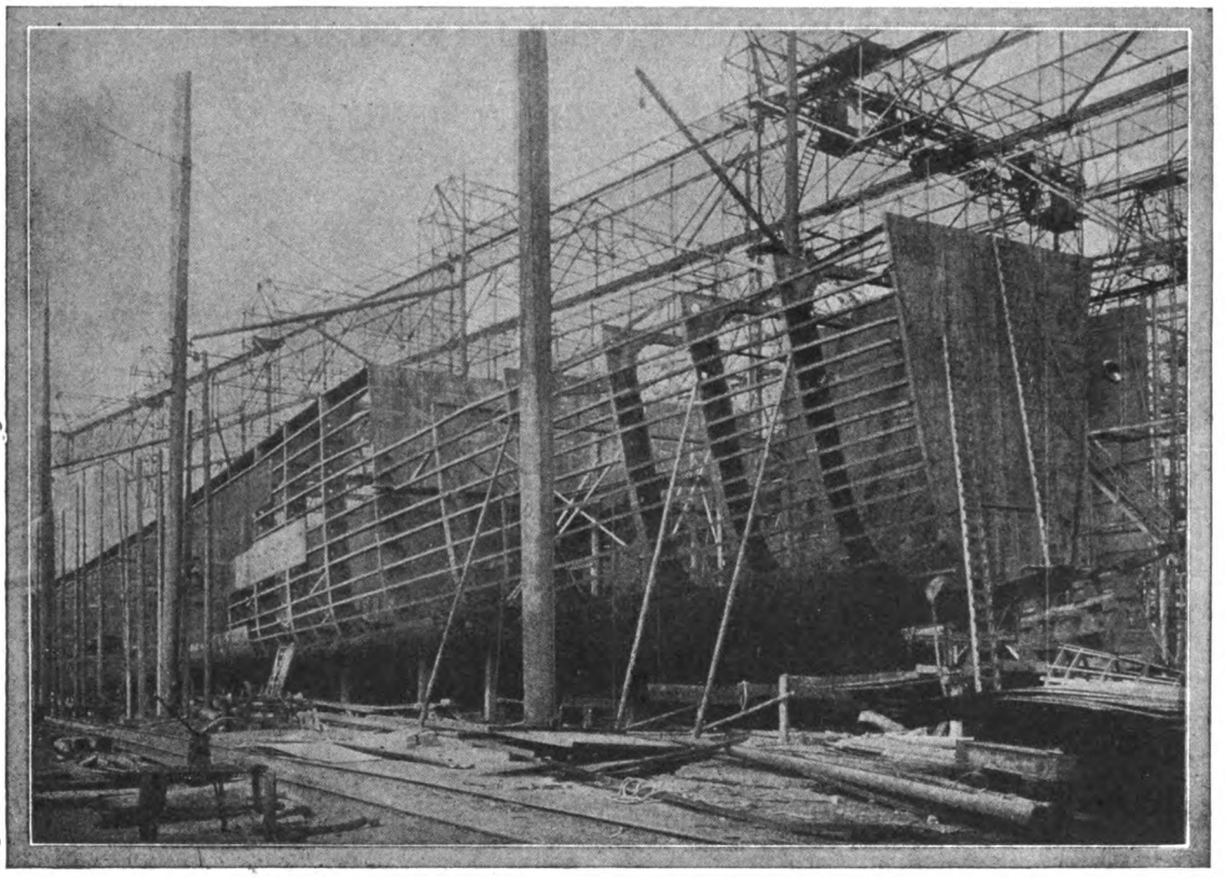


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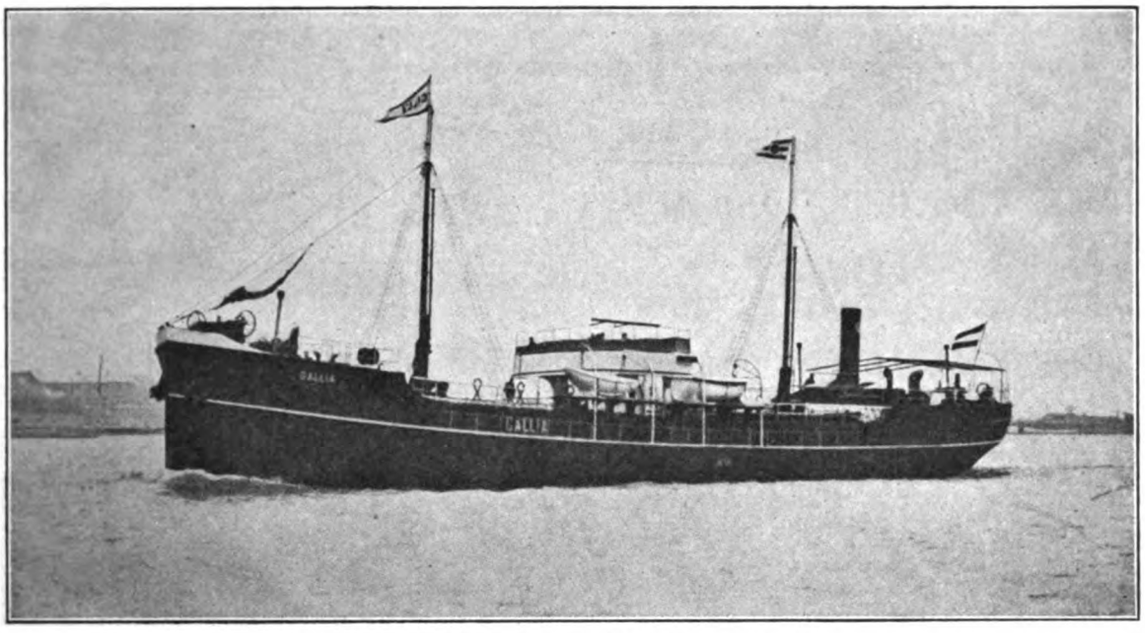
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"Moush"	480	"Camoin"	160	"Pionier"	100
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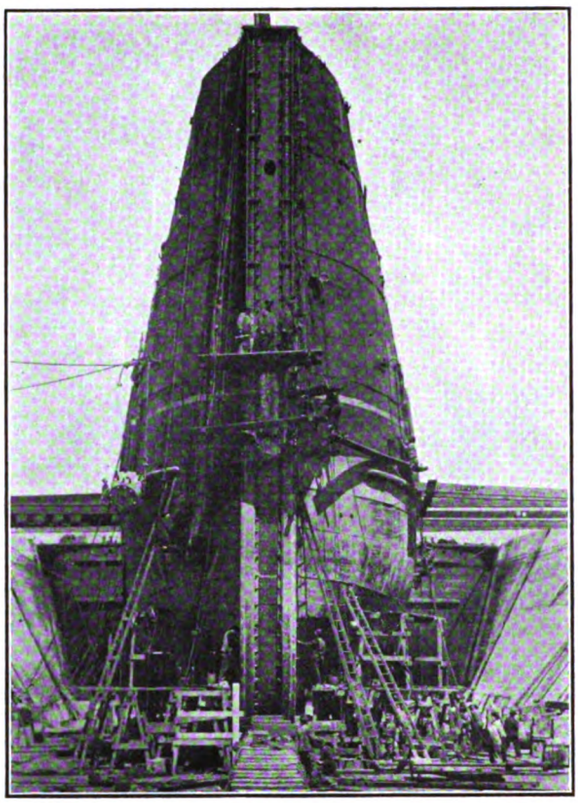
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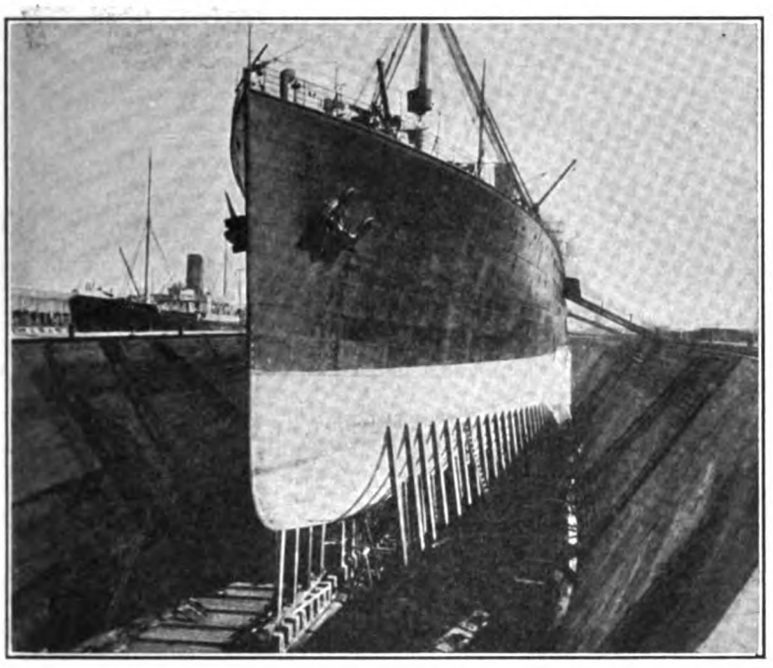
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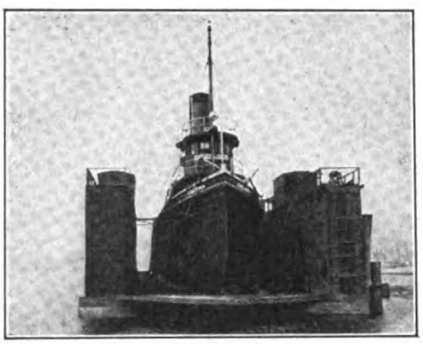
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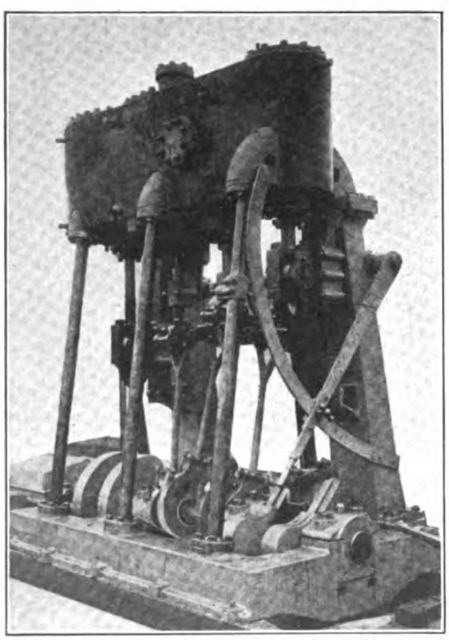
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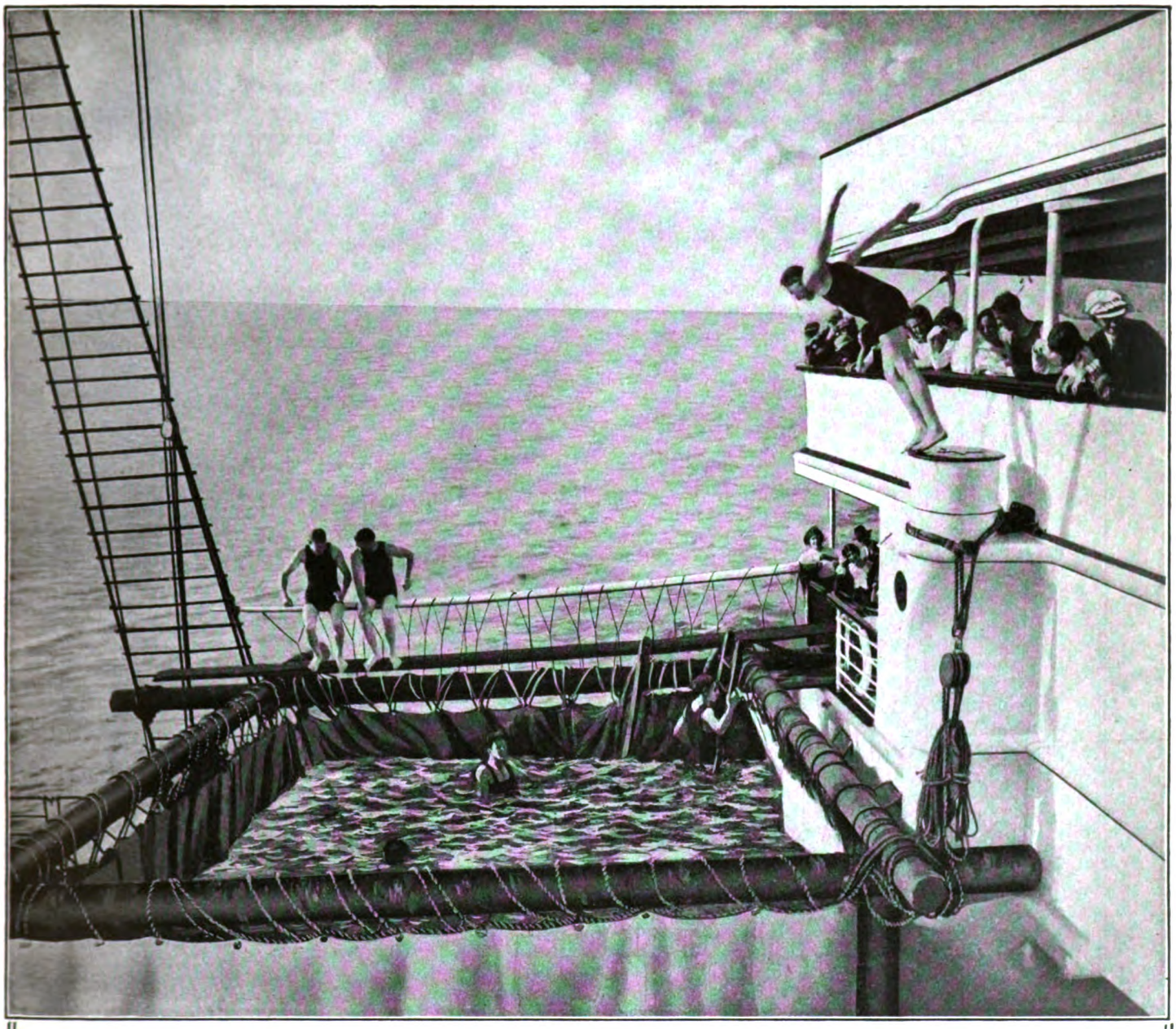
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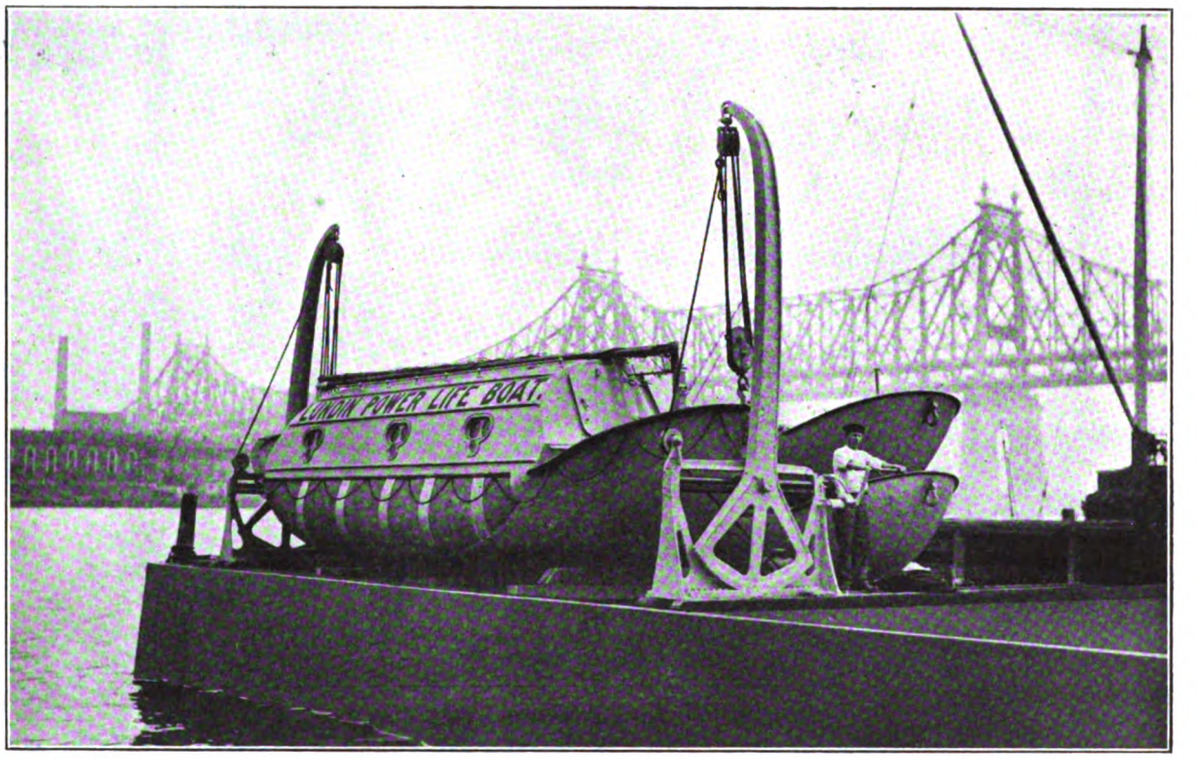
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VOL. XII. No. 1. SAN FRANCISCO JANUARY, 1915.

The Rise of American Foreign Trade Shipping

THE first Congress of the United States had hardly met when it was besieged by demands from the people to afford protection to American shipping engaged in the foreign trades. In response to these persistent demands, the first tariff Act provided a lower rate of duty on all goods imported in American vessels. The very first paragraph of the Act related to the importation of teas direct from China or India and decidedly encouraged an East Indian trade in American bottoms. This protective Act built up a commerce that would have been utterly impossible without its aid, for American merchants had but small capital and smaller vessels.

As a general protection for our vessels outside the Chinese and East Indian trades, a rebate of ten per cent. was made on all import duties on American carried cargoes. In those days the merchant usually owned the vessel carrying his goods, so that ship protection was equally favorable to the merchant and the ship. Another protection afforded the American merchant was a liberal credit system on duties, extending over four months on articles of West India production, twelve months on wines from Madeira, twenty-four months on teas from the Orient, and six months on all other goods. These measures had the effect of inducing wealthy European merchants to cast in their lot with the new country.

The discrimination in the tonnage duties enacted in 1789 was very marked. American built, American owned vessels paid six cents per ton; American built vessels partly or wholly foreign owned paid thirty cents per ton; and all other vessels paid fifty cents per ton. At the same time foreign shipping was practically eliminated from the coastwise trade. The result of all this protection was an increase in shipping and foreign commerce that has never been equaled in a like period in the history of any other people.

The following table is worthy of study, as it shows clearly the wonderful rise in the importance and strength of American foreign trade shipping from its inception in 1789 to the years of its zenith, 1825 and 1826, and then its downward trend, slow at first, but rapidly accelerating. The effects of the war of 1812-1815, also of the Algerine piracy raids of 1792-1793, and the crippling of the merchant marine by the Civil War, all show vividly on the table. The first six years are given year by year, after which are averages for five-year periods up to 1890. The true index of our shipping strength is shown in the column giving the cubic feet of ship carrying capacity per capita, and the reader will deduce some very sad reflections from a close study of this column. The sudden drops in foreign trade per capita during war time also shows the result of an unprotected foreign trade merchant marine:

Year.	Tons of shipping in foreign trade.	Cubic feet per capita.	Foreign trade per capita.	Imports carried in American ships %	Exports carried in American ships %
1789.....	123,893	3.64	[illegible]	17.5	30.0
1790.....	346,254	9.75	12.17	41.0	40.0
1791.....	363,110	9.81	13.03	53.0	52.0
1792.....	411,438	10.55	13.89	67.0	61.0
1793.....	367,734	8.96	13.95	82.0	77.0
1794.....	438,863	10.32	15.91	91.0	86.0
1795.....	529,471	12.03	26.76	92.0	88.0
1796-1800...	620,426	12.40	29.24	91.6	87.8
1801-1805...	635,293	10.69	28.68	89.8	86.0
1806-1810...	852,359	12.42	24.08	92.5	88.5
1811-1815...	744,774	9.31	11.66	76.2	70.6
1816-1820...	672,090	7.29	20.28	82.8	78.6
1821-1825...	615,749	5.76	14.45	93.16	86.86
1826-1830...	657,231	5.38	12.69	93.46	86.78
1831-1835...	667,735	4.73	15.19	90.6	76.7
1836-1840...	720,889	4.49	16.50	88.54	78.8
1841-1845...	854,804	4.59	11.97	85.6	75.48
1846-1850...	1,171,583	5.35	13.51	81.2	69.4
1851-1855...	1,932,212	7.54	19.37	74.06	69.3
1856-1860...	2,314,520	7.78	22.88	69.7	70.9
1861-1865...	1,920 483	5.76	17.18	40.52	44.54
1866-1870...	1,468,571	3.97	24.95	30.1	37.2
1871-1875...	1,401,327	3.38	30.16	28.8	27.3
1876-1880...	1,495,912	3.17	26.77	29.62	20.6
1881-1885...	1,273,198	2.34	28.63	20.7	13.52
1886-1890...	984,887	1.58	24.28	18.15	11.63

With American vessels carrying in the neighborhood of ninety per cent. of both our imports and exports, it may well be imagined that England cast about eagerly for something to stem the tide. The following editorial from a London Times of 1827 gives some inkling of the English viewpoint of a situation that threatened their even then proverbial supremacy on the ocean:

"It is not our habit to sound the Tocsin on light occasions, but we conceive it to be impossible to view the

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existing state of things in this country without more than apprehension. Twelve years of peace and and what is the position of Great Britain? The shipping interest, the cradle of our Navy, is half ruined, our commercial monopoly exists no longer. We have closed the West India islands against America from feelings of commercial rivalry. Its active seamen have already engrossed an important branch of our trade to the East Indies. Her starred flag is now conspicuous on every sea and will soon defy our thunder."

However, America was not to dominate the sea and in 1828 a start was made on free trade principles applied to shipping in the foreign trade. The United States threw down the bars of discriminating duties and left them down. England also threw down the bars of discriminating duties, but replaced them by other measures equally effective. She removed one protection and replaced it by another. America swept every vestige of defense from her foreign trade shipping and left it fully exposed to the ravages of a great world's trade war. The result was inevitable. The American law-makers seem to have been blinded by their country's splendid success on the sea and were seized with the hallucination that their shipping could stand alone and unassisted against the world. They awoke many years later to the fact that the American foreign trade merchant marine was practically non-existent and, as they had seemed to get along fairly well without it, they made no determined effort to regain their former place of honor and influence on the high seas.

The chief champion of the Act doing away with protection for the American foreign trade ship was Senator Woodbury of New Hampshire. Here is a sample of this Senator's reasoning or vaporing on this subject and it will be found strangely familiar to the ear of anyone who has followed the proceedings of Congress for the past twenty years:

"These principles embraced the great paramount one of all liberal governments, that trade shall be free; that all shackles of commerce should be stricken off; and in accordance with the lights and spirit of the present age, that everything in navigation, as in all other kinds of business, should be left to the fair competition of industry, enterprise and skill. That in a country that justly boasts of the freedom and superiority of its institutions nothing is to be feared from a rivalship on this subject, free as air and as extensive as the widest range of civilization.

"We are known to possess a skill and economy in building vessels, a cheapness in fitting them out, an activity in sailing them, which, without discrimination would give us an advantage in coping with any commercial power in existence. Such are the accurate calculations of our merchants, the youth and agility of our seamen, and the intelligence of our shipmasters, that American vessels can, on an average, make three trips to Europe while a foreign vessel is making two. It must be manifest to all that circumstances like these rather than any discriminating duty, must always give and maintain to us a superiority and protection which leaves nothing to be feared from the fullest competition."

While Senator Woodbury was thus expounding his theory of our invulnerability on the sea, the chief seaport of his native State had 40,000 tons of shipping engaged in the foreign trade. How many tons of shipping engaged in the foreign trade has Portsmouth, New Hampshire, to-day?

In short, we removed discriminating duties and did not replace them either by other protection or encouragement of shipping. We opened our ports on equal terms to the ships of all nations and the other maritime powers lost no time in encouraging their merchants and shippers to take advantage of the richest trade offering that had ever been thrown before a hungry business world. Once the bars were down it was not long before the United States became the milch cow of the maritime powers.

There are those who believe that a return to discriminating duties would solve the foreign trade shipping problems of the United States. The chief champion of this view was the late W. W. Bates, who worked zealously for many years in a vain effort to turn the faces of the American people once more to the sea. It is doubtful, however, that the measures which proved effective 120 years ago would suit the spirit of the world to-day. Discrimination would beget retaliation and the trade of the world would become chaotic. England found a way to make her shipping profitable without resorting to direct discrimination against any other power, and we must follow the spirit, if not the letter, of her example if we would once more cover the Seven Seas with our traders.

BRAVERY A MATTER OF VIEWPOINT.

A great deal has appeared lately in public prints relative to the bravery of the various nationalities engaged in the present European struggle. As a general rule one's own people are braver than the enemy. This is universal. English papers at the present time are loud in their praises of French bravery and yet during the long French and English wars some English writers were not so willing to concede a great measure of valor to the French. As far as personal valor is concerned there is little doubt that the people of one civilized nation are fully equal to the people of any other civilized nation. Looking over an old English dictionary of sea terms compiled by William Falconer and published in 1789, we find the following choice bit of sarcasm at the expense of the French nation. The word "Retreat" is defined as follows:

RETREAT, the order or disposition in which a fleet of French men-of-war decline engagement, or fly from a pursuing enemy.

There is also a footnote on this word, which reads:

The reader, who wishes to be expert in this manoeuvre, will find it copiously described by several ingenious French writers, particularly L'Hote, Savarien, Morogues, Bourde and Ozane; who have given accurate instructions, deduced from experience, for putting it in practice when occasion requires. As it is not properly a term of the British marine, a more circumstantial account of it might be considered foreign to our plan. It has been observed in another part of this work (a), that the French have generally exhibited greater proofs of taste and judgment in the sculpture, with which their ships are decorated, than the English; the same candor and impartiality obliges us to confess their superior dexterity in this movement.

From this it would appear that to the narrow and provincial mind, bravery is purely a national virtue and that one's own nation possesses a monopoly of it at the expense of all other nationalities.

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Foodstuffs as Contraband of War

By LOUIS S. HENGSTLER.

IN 1907 Sir Edward Grey wrote to Sir Edward Fry, First Plenipotentiary, Second Peace Conference at the Hague:

"With regard to contraband, many most difficult questions arose during the late war. . . . His Majesty's government recognize to the full the desirability of freeing neutral commerce to the utmost extent possible from interference by belligerent powers, and they are ready and willing for their part, in lieu of endeavoring to frame new and more satisfactory rules for the prevention of contraband in the future, **to abandon the principle of contraband of war altogether, thus allowing the oversea trade in neutral vessels between belligerents on the one hand and neutrals on the other to continue during war without any restrictions,** subject only to its exclusion by blockade from an enemy's port. They are convinced that not only the interest of Great Britain, but the common interest of all nations, will be found, on an unbiased examination of the subject, to be served by the adoption of the course suggested."

The conference at the Hague in 1907 did not adopt the proposition that the principle of contraband be abandoned altogether, and the matter came up again at the International Naval Conference at London, in 1908-1909, in which the ten naval powers participating in the conference at the invitation of England reached an agreement embodied in the "Declaration of London" of 1909. These powers were Germany, United States, Austria, Spain, France, England, Italy, Japan, Netherlands and Russia. None of these nations is legally bound by the rules laid down in the Declaration, but they all formally "agreed that the rules . . . correspond in substance with the generally recognized principles of international law." Considering that the British Government extended the invitation "to meet in conference in order to determine together as to what are the generally recognized rules of international law" in a naval war; considering also that the discussions were carried on in London, and that Great Britain has recognized the principles of the Declaration in former wars, it follows that England is perhaps under special obligations to neutrals to conform the practice of its naval war to these principles.

If the Declaration of London is the law which England professes to accept in this war, the legal position of foodstuffs is governed by articles 24 and 33 of the Declaration. Article 24 enumerates foodstuffs as "conditional contraband." Article 33 provides:

"Conditional contraband is liable to capture if it is shown that it is destined for the use of the armed forces or of a government department of the Enemy State, unless in this latter case the circumstances show that the articles cannot in fact be used for the purposes of the war in progress."

It follows, therefore, that, under the Declaration of London, foodstuffs cannot be confiscated as being contraband, if they are consigned to private parties and not shown to be intended for combatants. If the Declaration is the law of this war, the method of starving a nation into submission by capture on the high seas of foodstuffs destined to the ports of that nation, is illegal. If England seeks for a justification of the practice, it must be found outside of the law to which she has formally consented and to which she formerly submitted. Individuals and nations, choosing to act outside of the law, yet realizing the necessity of explaining their acts, are sometimes successful in persuading themselves and others that they are justified by a code which is higher than the law, viz.: the code of high morality. Thus it may be argued that the attempted starvation of Germany's population will bring her soldiers to their knees quicker, will make the war shorter and therefore, instead of destroying lives, will probably save lives. If we are correctly informed, however, there are among the sixty millions of the inhabitants of Germany quite a number of millions of women and children who would be likely to suffer severely from the humane effort to starve that ill-advised nation into submission; besides Germany must feel responsible for the feeding of the population of the territories in Belgium and France which her armies now occupy. If the German non-combatants are starved, it is certain that the non-combatants in the Belgian and French occupied territories cannot be fed. It would certainly seem that adherence to the law as adopted in the Declaration of London, as far as foodstuffs is concerned, is a safer method of preventing the infliction of misery upon innocents than the abandonment of law and the adoption of courses of action in the name of morality or humanity.

Before this war England was content to practice the principles contained in the Declaration of London. During the recent Boer war the position of the British Government was thus defined by Lord Salisbury:

"Foodstuffs with a hostile destination can be considered contraband of war only if they are supplies for the enemy's forces. It is not sufficient that they are capable of being so used. It must be shown that this was **in fact** their destination at the time of seizure."

The mere fact that they are foodstuffs consigned to a port of a belligerent, according to this English doctrine, does not justify the other belligerent to seize and condemn them. Again, when Russia, in the Russo-Japanese war, designated foodstuffs such as rice as contraband of war, the British government, then speaking in the capacity of a neutral who had foodstuffs, especially rice, for sale, protested against the prohibition as being "inconsistent with the law and policy of nations"; she did not contest that, "in particular circumstances, provisions may acquire a contraband character, as, for instance, if they should be **consigned direct to the army or fleet of a belligerent,** or to a port where such fleet may be lying"; but she refused to admit that, "if such provisions were consigned to the port of a belligerent (even though it should be a port of naval equipment), they should therefore be necessarily regarded as contraband of war." Our own government, at that time, took the same position, viz.: that rice and provisions were contraband only **"if destined for a belligerent government,** its administration, army, navy, fortresses, naval ports, or purveyors." If these goods were "addressed to private individuals," they could not be confiscated, even if destined to the port of a belligerent; a fortiori they should be safe when sent to neutral ports.

Article 34 of the London Declaration provides that goods are contraband and as such confiscable if their

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consignment is addressed to a merchant in an enemy port, "when it is well known that this merchant supplies articles and material of this kind to the **enemy.**" The question was raised in the House of Commons whether the goods are contraband if such merchant supplies such goods to the non-combatant part of the enemy. The Under Secretary for Foreign Affairs declared that the word "cannot possibly apply to a mere merchant who supplies goods to the **general public.**" The Secretary of Foreign Affairs, Sir Edward Grey, stated "that the word 'Enemy' in Article 34 can only mean the **Enemy government.**" From this it follows that, in 1909, the British Government held it lawful for a neutral to send foodstuffs to a belligerent port, consigned to a merchant established there.

In the present war Great Britain occupies the status of a belligerent, but **we** still occupy the status of a neutral who has foodstuffs for sale. Is it indelicate for us to insist that the position which our government took in the Russo-Japanese war, and which was then vigorously shared by the British government, is still the correct position? On what ground could Great Britain now claim that she was **then** wrong and that we were **then** and are now wrong? We concede to every individual, and every nation, the right to progress, to learn, and to change its mind as it progresses and learns; but it is not easy to see that the single circumstance that Great Britain then was neutral and now is belligerent is sufficient to change the principles and practices of international law.

If our vessels are stopped on the high seas, and foodstuffs carried under our neutral flag and consigned to neutral destinations, or even to a general merchant in a belligerent port, are seized, such seizure is made in utter disregard of a principle adopted under the wing of the British government in the capital of Great Britain, and which principle was a short time ago professed by English statesmen and by English diplomats, including Sir William Grey himself. We may not be interested in the seizure of foodstuffs carried under neutral flags in so far as it is an attempt to starve another belligerent, but we are directly interested in it in so far as it has the effect of starving our legitimate neutral trade. Perhaps England, as the foster mother of the small States, will compensate them for the injury done to Dutch, Swedish, Danish and Norwegian trade; but the United States does not need the care of a benevolent foster mother. As a big and strong nation, as leader of the neutrals, we could, and possibly should, insist that the principles professed, adopted and practiced by other nations when they were neutrals, should now be applied for our own benefit, and for the benefit of. neutrals of the present and all future times. The world has a vital interest in preventing the Declaration of London of 1909 from being added to the numerous "scraps of paper" which the war-god has recently thrown into the waste-basket of history. Apart from our self-interest, the greatness of our country as the most powerful of the neutrals of the world carries with it the obligation to guard with jealous firmness the sanctity of the rules solemnly adopted when ten great modern nations met as friends, and in a frame of mind which made them capable, in the language of the Declaration, of "recognizing all the advantages which, in the unfortunate event of a naval war, an agreement as to said rules would present, both as regards peaceful commerce and as regards the belligerents and their diplomatic relations with neutral governments."

NOVEL DESTROYERS.

The Yarrow yard at Glasgow will shortly complete two Japanese destroyers of more than usual interest. They are some 260 feet in length and 27.3 feet beam, and while the main propelling machinery in each ship consists of two 12,000 h.p. steam turbines, driving twin screws, each vessel has also in addition two 600 b.h.p. Diesel installations for cruising purposes. The Diesel engines drive the propellers as the main machinery, the arrangement being, we understand, to have a solid shaft working inside a tubular shaft. The Diesels are six-cylinder, four-cycle models, and are being built by Messrs. Burmeister & Wain of Glasgow. Under full power the vessels should be able to keep up a speed of round 34 knots, while under cruising machinery alone a speed of 13 or 14 knots should be attained. The great advantage of fitting cruising machinery in small war vessels is, of course, the enormous saving effected in the running cost, also that when high compression internal combustion engines are installed the vessel can be got under way immediately at any time.

There is, of course, the drawback in fitting cruising machinery, in so much that the displacement of the vessel is increased to the amount of the weight of the said machinery, and when the vessel is running full power this must reflect somewhat on the top-speed attainable.

On Thursday, the 19th November, Messrs. Harland & Wolff, Ltd., Belfast, launched the large, steel, triple-screw passenger steamer "Almanzora" for the Royal Mail Company's South American mail service.

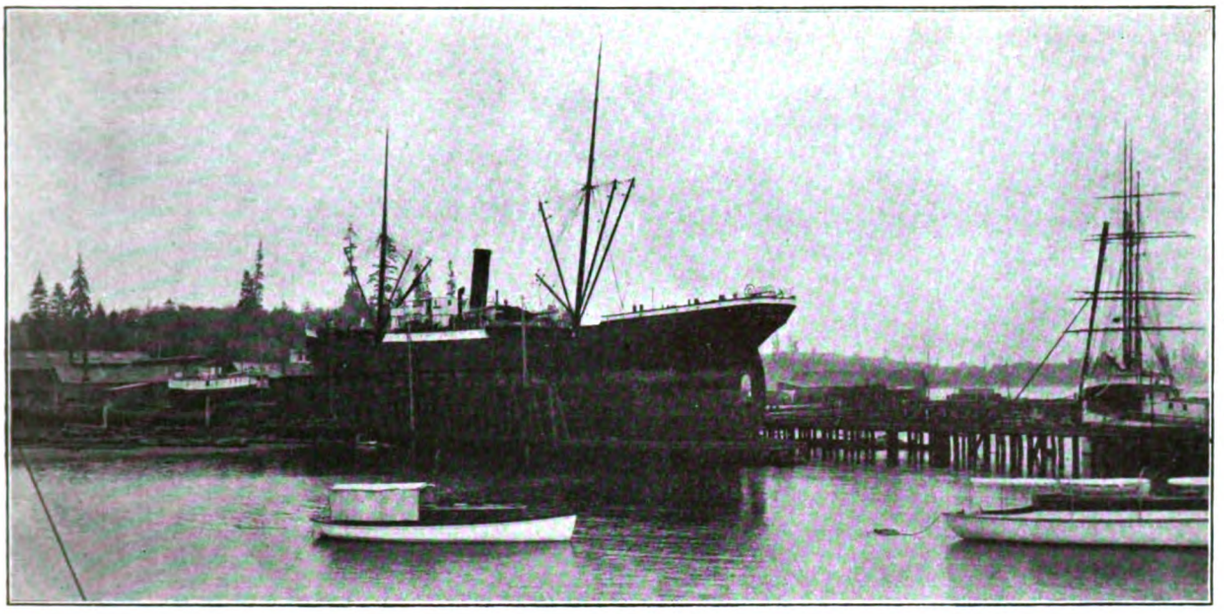
The "Almanzora" is nearly 600 feet long by 67 feet beam, and will be about 15,600 tons gross. She is a triple-screw vessel, and will have a combination of reciprocating and turbine engines. To meet the requirements of the frozen and chilled meat trade, the "Almanzora" will be provided with an extensive installation of refrigerating plant and insulated chambers.

The luxurious character of the passenger accommodation in the Royal Mail steamers is well known, and in the "Almanzora" special care is being taken to ensure that the decorations will satisfy the most esthetic taste, the style of the different rooms being varied, with a view to ensuring the most artistic effect. In the 1st class there will be suites de luxe, consisting of bedroom, sitting-room and bathroom, intercommunicating state cabins with bathroom attached, and a large number of single and double berth rooms, many of which will be fitted with bedsteads instead of berths. Most of the inside cabins will be arranged on the tandem principle, thus giving natural light and ventilation to them. All cabins will be tastefully decorated, well ventilated, and fitted with electric light and fans. The dining-saloon will be beautifully decorated, and fitted with small tables on the restaurant style to accommodate about 400 people. There will be a children's saloon adjoining the main saloon. The two smokerooms will be richly upholstered and in addition to the handsomely decorated social hall there will be a daintily furnished ladies' boudoir.

The "Almanzora" will be fitted with a passenger lift serving five decks, gymnasium, barber shop, dark room for photography, cloak room, enquiry office, and servants' rooms. The promenade decks will be spacious. Special attention is also being paid to the 2nd and 3rd class accommodation, which will be a distinct feature of the vessel.

During construction the vessel has been under the superintendence of Captain G. N. Hicks, Marine Superintendent, and Mr. James E. Wimshurst, Superintendent Engineer.

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The Hall Brothers' Marine Railway.

Shipbuilding During 1914

The marine department of the Union Iron Works report the following tonnage for the year 1914:

Oil tanker "Frank H. Buck," of 6076 gross tons, 2600 horsepower and 10½ knots speed, for the Associated Oil Company, completed and delivered.

Oil tanker "Lyman Stewart," of 6076 gross tons, 2600 horsepower, 10½ knots speed and built to the order of the Union Oil Company, now 90 per cent. completed.

Oil tanker "J. A. Moffett," of about 6000 gross tons, 2600 horsepower and 10½ knots speed, building to the order of the Standard Oil Company, and now about 65 per cent. completed.

A large steel oil barge for the Standard Oil Company finished and delivered.

Lock entrance caisson for the Panama Canal, fully described in a previous issue of the "Pacific Marine Review," finished and delivered.

Three Diesel engined submarines for the United States Navy, finished and delivered.

The Seattle Construction and Dry Dock Company have had a fairly busy year although the amount of new construction delivered during 1914 was small. The meagerness of new work, however, was largely compensated for by repair jobs and a large amount of docking. The work delivered includes the United States submarine K-4 and three Government tugs, the "Arapahoe," "Mohave" and "Tillamook." These three tugs are of about 250 tons gross register each, have reciprocating engines of 800 indicated horsepower and are capable of 11 knots speed. Under construction at this plant is the "Bushnell," a submarine fleet tender of about 2500 gross tons. This interesting craft will be fitted with Parsons turbines of 2500 indicated horsepower and is to make 14 knots on trial.

The plant of the Hall Brothers' Marine Railway & Shipbuilding Company is situated about eight miles from Seattle on the landlocked bay of Eagle Harbor, which, since the establishment of this plant, has become the principal laying up point for disengaged vessels. At the present time, due to the war in Europe and the lack of business for ships resulting therefrom, this harbor is full of idle vessels of all classes from the Hamburg-American steamer "Saxonia" to the small cannery tenders and tug boats engaged in the fishing industry. At present there are some sixty odd craft tied up in Eagle Harbor,—a mute evidence of the deplorable condition of shipping business at this time.

During the year 1914 the Hall Brothers' plant received a fair amount of docking and repair business. It has handled practically one-half of the docking business on the Sound for vessels within the limits of its docking



U. S. Snagboat "Swinomish."

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capacity, which is 4000 tons and 325 feet in length. In addition to the marine railway of the above capacity, a smaller set of ways capable of handling 500 tons is operated, the latter dock being used largely for hauling out and sidetracking small vessels for winter storage. It is becoming more and more the universal custom at the Sound to haul out yachts and other disengaged vessels to allow of a thorough drying out before the spring painting.

The repair work of the plant consists largely in repairing wooden vessels, caulking and the installation of spars and rigging, the latter being a very heavy item in the yearly business. Puget Sound has long been noted for its splendid spar timber and a large stock of spars and masts are always carried in stock, the Hall Brothers keeping on file the sizes of the sticks in a large proportion of the Pacific Coast fleets so that spars may be ordered in advance and be ready for installation upon the vessel's arrival at the yard. As the mast spars for a lumber schooner average 26 inches in diameter and 110 feet in length great care is taken in the selection of the timber. The trees suitable for spars are picked out and felled and only those showing clear grain are utilized. The cost of one of these spars installed complete will average about $450.

Among the interesting vessels quite recently taken out on the marine railway was the six-masted barkentine "E. R. Sterling." This vessel was admitted to American registry only a short while ago being formerly named the "Everett G. Griggs." Like many other vessels she had been laid up in Eagle Harbor for some time, but has just been chartered to load a coal cargo from Nanaimo for San Francisco and will take a cargo of barley from here to Australia and will probably return to this Coast with Australian coal. This vessel is now named for her master and managing owner, Captain E. R. Sterling, who has operated her for the past few years in the lumber trade between Columbia River and Puget Sound ports to Australia. With the prevailing low freight rates of the past few years it is only the large windjammers like the "Sterling" that can be operated successfully. It is rumored that Captain E. R. Sterling will leave his ship at San Francisco and go to Europe to purchase a still larger vessel for the same trade and his son, R. M. Sterling, who has been acting as first officer will assume command. Captain Sterling also owns and operates the American ship "W. F. Babcock" in this same trade.

The Hall Brothers at the present time have two Government vessels under construction. The snagboat "Swinomish" is being built for the United States Engineers Department for use on Puget Sound and its tributary navigable rivers—the Puyallup, Duwamish, Snohomish and Skagit—and will be used in removing the snags which accumulate during the flood season on these rivers. This vessel is about 90 per cent. complete and her machinery is now being connected up ready for use. She is just about due for delivery at the present time and represents an investment of about $50,000. The "Swinomish" is fitted forward with a heavy "A" frame carrying a seventy-foot derrick boom designed to lift seventy-five tons.

The second Government vessel under construction is the light-house tender "Fern," being built for the United States Lighthouse Department for use in Alaska in the newly created Sixteenth Lighthouse District. This vessel will be used principally in the inland waters and passages along the Alaskan coast and will be utilized in placing buoys, carrying supplies to the various stations and in general lighthouse service. On account of the dangerous nature of the channels it was deemed advisable to construct this craft of wood, there being less danger of fatal damage in grounding with wood than with a steel hull. The "Fern" is to be oak-framed throughout and planked with native fir. The oak for framing was secured in West Virginia and was sawed to shape there and shipped west for assembling. The "Fern" is to be 108 feet long over all, 32 feet beam and 10 feet 3½ inches depth of hold. Her draft, with normal load, will be 8 feet and the corresponding displacement 225 tons. She will be powered with a triple expansion engine with cylinders 10", 17½" and 28" by 18" stroke, driving a propeller 6' 4" in diameter and 8' 3" pitch. The engine will develop 300 indicated horsepower.

Steam will be supplied by an Almy Safety Water Tube boiler having 1790 square feet of heating surface and designed for a working pressure of 200 pounds. The boiler will be fitted to burn oil fuel and storage tanks of 3000 gallons capacity are being provided.

In general the "Fern" resembles the usual lighthouse tender type, having an open deck forward for handling buoys and a heavy mast and derrick with a special designed, heavy-duty winch. This winch will be located in the forehold and operated by levers banked on the main deck near the mast. There will be a raised forecastle deck forward with crew's quarters underneath and quarters for the officers and inspectors will be located aft, the poop extending forward to about amidships. On top of this bridge deck will be located the pilot house and texas which will include the master's quarters. The "Fern" will be launched about the first of the year and will be ready for delivery in March. She will cost approximately $65,000.

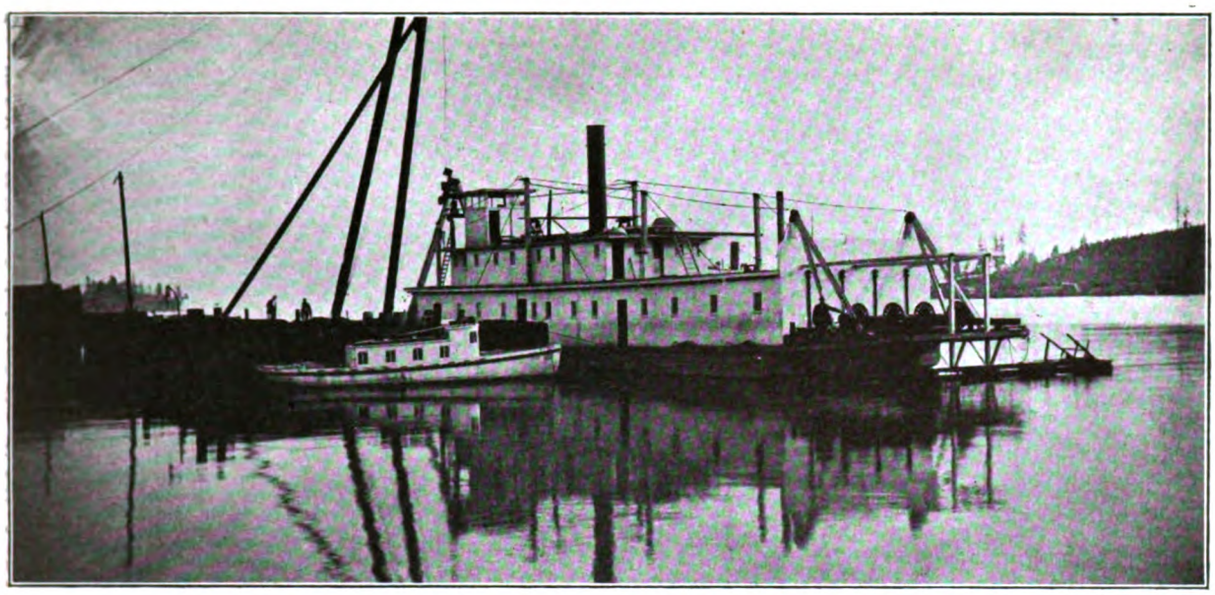
In regard to the 1915 outlook, Hall Brothers report that everything looks favorable for a busy year. Numerous inquiries, principally by fishing companies engaged in the Alaskan and Puget Sound fisheries, point to considerable activity in this line of work in the immediate future.

J. F. Duthie & Company, shipbuilders and engineers of Seattle, Wash., during the past year delivered the ferryboat "Leschi" to the port of Seattle. The "Leschi" is of 490 gross tons and driven by a horizontal engine of 900 indicated horsepower. The hull is of steel with a wooden superstructure and her contract price was $87,000. Duthie & Company report that the outlook is fair for the coming year.

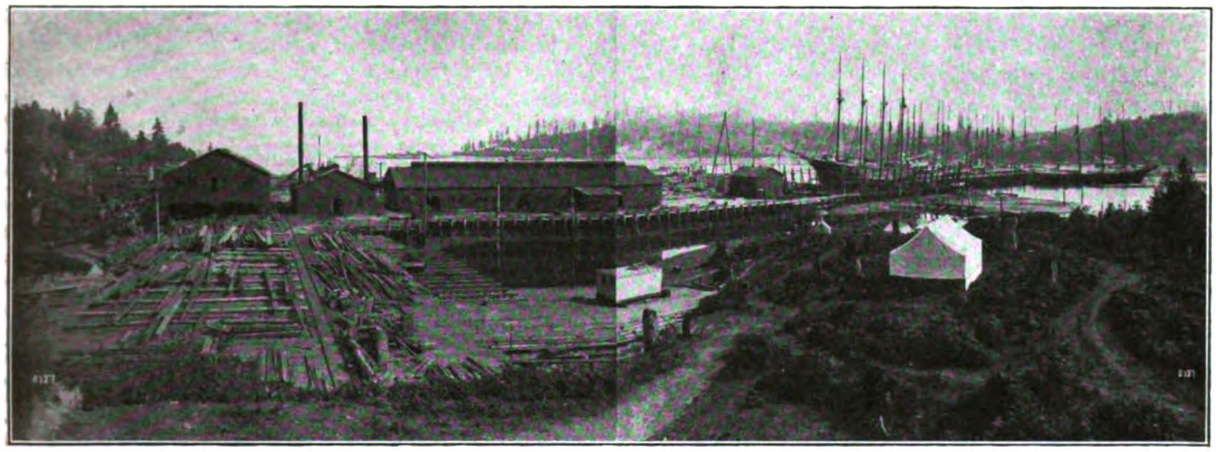
The Detroit Shipbuilding Company of Detroit, Michigan, during the year turned out one large steamer, the "Adrian Iselin," built to the order of the George Hall Coal Company of Ogdensburg, New York. This craft represents the most advanced type of coal carrier on the inland lakes. She carries a cargo of 3150 tons which is loaded in about four hours and unloaded in from nine to ten hours by two Mead-Morrison hoists. In the course of an ordinary season this craft will handle 250,000 tons of coal. The "Iselin" is 257' 0" over all, 244' 0" between perpendiculars, 43' 0" beam and 23' 0" molded depth. She has eleven cargo hatches 9 by 28 feet in size. She is a single decked bulk freight steamer with house on main deck aft, forecastle forward with steel texas over; triple expansion engines of 1000 horsepower located aft, two Scotch boilers 12 feet in diameter and 11' 6" long supply steam at 180 pounds.

The Johnston Brothers of Ferrysburg, Michigan, have handled five contracts during the year, the yard num-

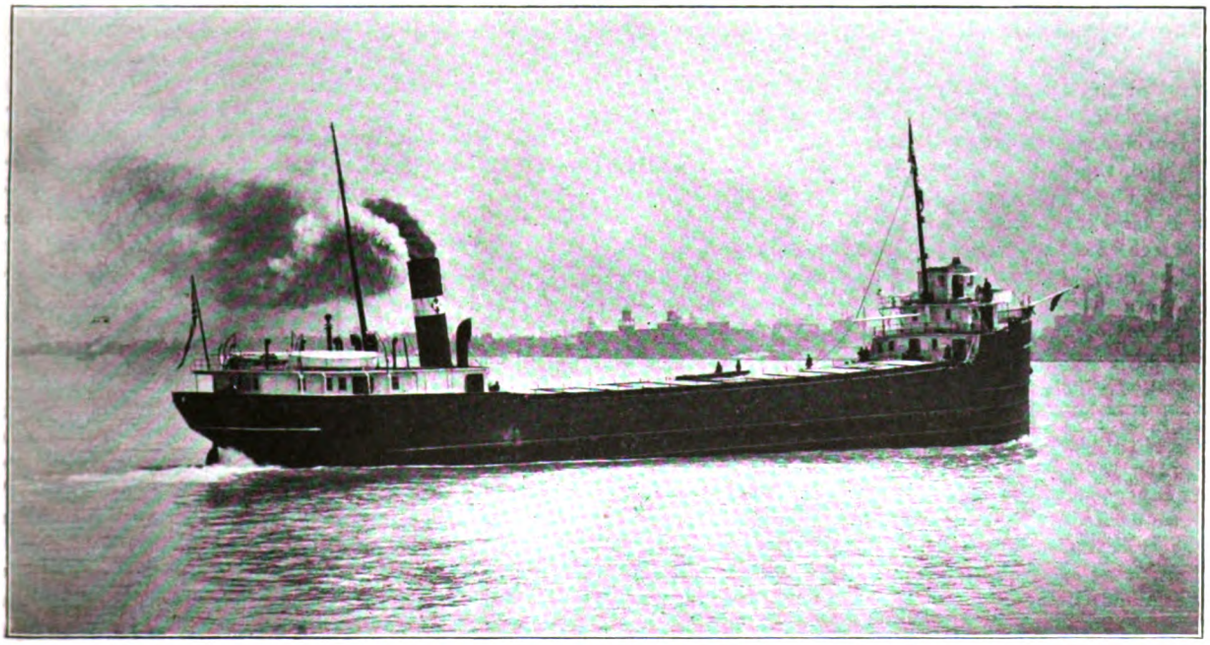
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The Snagboat is of considerable size.



Panorama of the Hall Brothers' Plant.



The "Adrian Iselin," a late type of lake collier.

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bers being from 61 to 65 inclusive. These include two 425 ton, electrically operated placer dredges for the Yuba Consolidated Goldfields Company; the "Ottawa" a 75-ton, two-decked, passenger ferry, engined with a 55 horsepower Diesel engine and capable of 10 knots speed; the "American," an 88-ton 14-knot harbor tug fitted with a 350 horsepower reciprocating steam engine and built to the order of the American Construction Company and the "Philip T. Dodge," a 68-ton eleven knot harbor tug, driven by a 175 horsepower steam engine and constructed for the International Paper Company.

The American Shipbuilding Company of Cleveland, Ohio, have constructed during the year three bulk freighters of the single-deck type, the "Robert L. Ireland," the "W. D. Crawford" and the "Howard M. Hanna, Jr." The "Ireland" is of 6387 gross tons, 1600 horsepower and ten knots speed. The "Crawford" is of 6385 tons gross, 1800 horsepower and ten knots speed, and the "Hanna" of 6204 gross tons, 1760 horsepower and 10 knots speed. One smaller vessel, the "Kelley Island," of 881 tons gross, 924 horsepower and ten knots speed was also finished during the year. The outlook for 1915 is far from encouraging, there being practically no new tonnage in sight.

The Manitowoc Shipbuilding Company built four hulls during 1914 beside a large amount of smaller and repair work. The four hulls bear yard numbers from 65 to 68 inclusive. The "Alice Stafford," No. 65, is a single decked harbor tug built for the Erie Land & Improvement Company of Chicago. She is of 141 tons gross and is driven by a compound reciprocating engine with cylinders 17 and 36 inches by 30-inch stroke. This vessel has been delivered to her owners and cost approximately $50,000.

The "Timothy J. O'Bryne," No. 66, is also a tug and was constructed to the order of the Lincoln Park Commissioners, Chicago. She is fitted with a single cylinder engine 22" by 24", is of 400 I.H.P., maintains a speed of 10 knots and represents an outlay of $35,000.

The "Charles M. Hall," No. 67, is a hydraulic dredge built for the St. Lawrence River Power Company at a cost of $130,000.

The "Richard B. Mellon," No. 68, is a large dipper dredge built for the same concern and cost in the neighborhood of $150,000. All this work has been delivered.

The Harlan & Hollingsworth Corporation of Wilmington, Delaware, have finished and delivered five hulls with their machinery during the year just closing. These craft hold the yard job numbers from 429 to 433 inclusive. The "Delaware," a harbor ferry, for the Delaware River Ferry Company of New Jersey was launched on March 28 and delivered on May 5, 1914. This vessel is of 807 gross tons, is equipped with machinery of 760 horsepower and makes a speed of 14 miles an hour. She is single-decked and is fitted with a through shaft right fore and aft having a propeller on each end.

The "Hanover" was launched on April 25 and delivered on June 20, 1914. She is an excursion boat of 467 gross tons, is equipped with 640 horsepower and makes a speed of 15 miles per hour. The "Hanover" is a two-decked side wheel excursion steamer for inland lake service. The machinery consists of two independent, single cylinder, inclined, surface condensing engines, one being connected to each paddle wheel shaft.

The "Commonwealth" is a floating grain elevator built for the Philadelphia Harbor Transfer, is of 258 tons gross and was launched on May 14th, but not delivered until October 4th, the delay being occasioned by the installation of hoisting machinery.

The "Weehawken," a harbor ferry for the New York Central and Hudson River Railroad was launched on July 23rd and delivered to the engine builders, the W. and A. Fletcher Company of Hoboken, New Jersey, on September 8, 1914. The "Weehawken" is of 1403 gross tons and is fitted with a continuous shaft having a propeller at each end.

The "Francis Hanify," described in the December number of the "Pacific Marine Review," is of the familiar West Coast steam schooner type, being constructed for the J. R. Hanify Company of San Francisco. She was launched on October 20th and delivered December 5, 1914. She is of 2588 gross tons, 1720 horsepower and 11½ knots speed. Her engines are triple expansion, inverted, surface condensing. She is specially designed for oil carriage as well as lumber.

The New York Shipbuilding Company of Camden, New Jersey, launched the following new tonnage during the year just closing:

The United States Navy dreadnaught "Oklahoma" of 27,500 tons displacement, 26,240 indicated horsepower and a designed speed of 20½ knots. This battleship is of special interest on account of her machinery, the Navy Department's conclusion to fit her with reciprocating engines instead of turbines or a combination of the two systems having caused considerable discussion among engineers. The "Oklahoma's" yard number is 130.

The "Ericsson," holding the yard number 141, is a torpedoboat destroyer of 1090 tons displacement and 19,150 horsepower. She is engined with a combination of Parsons turbines and reciprocating engines. This craft is now fitting out.

The "Mayor Gaynor," yard number 148, is a municipal ferry for New York harbor work. She is of 1634 gross tons, 2100 horsepower and of 14 knots speed. Her engines are reciprocating. The "Gaynor" has been delivered.

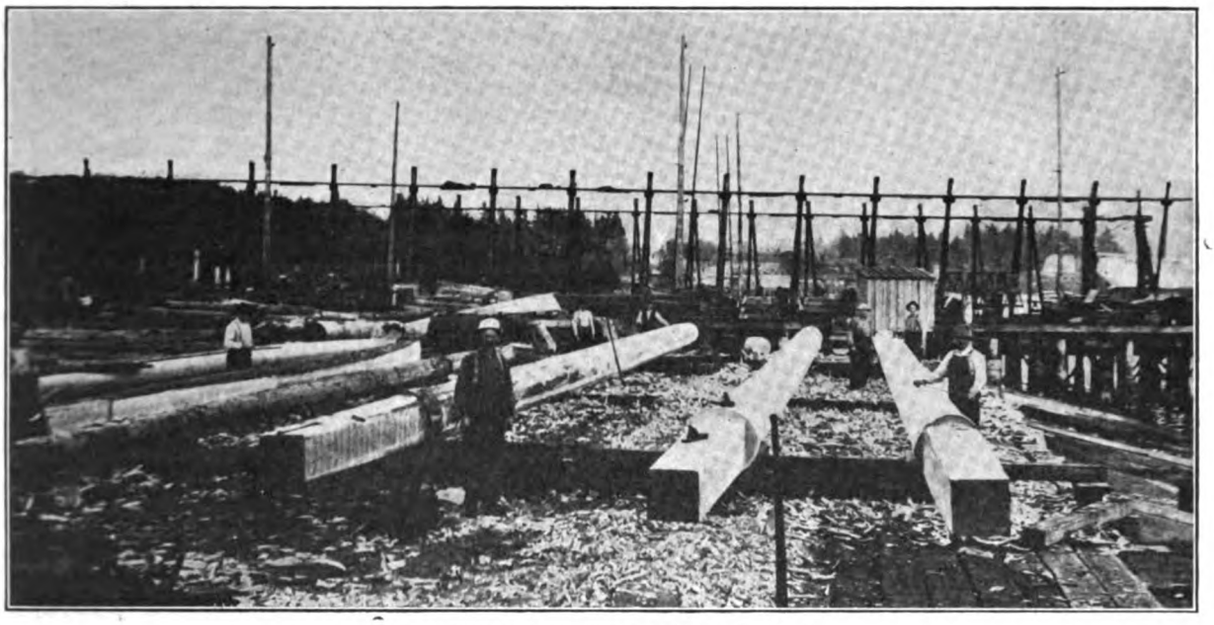
Yard numbers 152 and 153 represent the Long Island Railroad's car floats No. 16 and No. 17, each of 925 gross tons.

Yard numbers 154 and 155 represent a car float of 719 gross tons and a car barge of 1505 gross tons. These barges have been delivered.

The "Gulflight" and the "Gulfstream," bulk oil carriers of 5188 tons and having yard numbers of 156 and 157 were also delivered to their owners, the Gulf Refining Company. These craft are driven by triple expansion, reciprocating, inverted, surface condensing engines of 2650 horsepower giving a sea speed of eleven knots.

The Fore River Shipbuilding Corporation enjoyed a fair year's business during 1914. The following new construction was launched during the year: The battleship "Nevada," 583' 0" long by 95' 0" beam and of 27,500 tons displacement. This ship is engined with Curtis marine turbines of 26,500 I.H.P., the engines as well as the ship being built at the Fore River yard. Two submarines, the "K-5" and the "K-6," were launched during the year. These craft are of 819 tons displacement and are engined with Diesel internal combustion machinery constructed by the New London Ship and Engine Company. The "Fulton," a submarine tender, 216 feet long by 35 feet beam and engined with 900 I.H.P. New London Ship & Engine Company's Diesels, has also been delivered. This vessel is fully described in

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Four "Sticks" for the "Mary E. Foster."

the present number of the Pacific Marine Review. Another of the year's launches was the torpedo boat destroyer "Cushing," 300 feet long by 30′ 6″ beam. This craft has a displacemeut of 1050 tons and is driven by Curtis Marine Turbines of 17,000 aggregate horsepower, the turbines as well as the hull being built at Fore River.

The new merchant work launched during the year consisted of the sister freighters "Atlantic" and "Pacific" built to the order of the Emery Steamship Company. These vessels are 388 feet long by 54′ 4″ beam and are driven by triple expansion, reciprocating engines of 2100 horsepower.

Tonnage under construction includes the torpedo boat destroyer "Tucker," 310 feet long by 29′ 10″ beam, 1090 tons displacement and to be engined with Curtis Marine Turbines of 17,000 horsepower, also eight submarine boats for the United States Navy.

During 1914 Newport News turned out the following tonnage: The "John D. Archbold" and the "John D. Rockefeller," bulk oil carriers of 8374 gross tons, single screw, 2800 horsepower.

The "Neches" and "Medina," single screw freighters of 5426 gross tons and 4100 horsepower.

Navy oil barges numbers 5 and 6.

Four dump scows.

The "Edward Pierce," a collier of 4387 gross tons, single screw and 1700 horsepower.

The new tonnage on hand is all Government work and includes the battleships "Pennsylvania" and "Mississippi" and the revenue cutters number 26 and number 27.

The W. A. Fletcher & Company of Hoboken, New Jersey, aside from a very large output of marine machinery, built during 1914 two double ended ferryboats bearing the yard numbers 215 and 216. These craft belong to the New York Central and Hudson River Railroad and are of 1403 gross tons and 15 knots speed. They are engined with four cylinder compound engines having two 19″ and two 38″ cylinders and a common stroke of 28″, giving an indicated horsepower of 1600. The two ferries are named Catskill and Weehawken.

The William Cramp & Sons Ship & Engine Building Company of Philadelphia have the following work on hand which will be completed, or practically so, within the year 1914:

Three torpedo boat destroyers, the "O'Brien," "Nicholson," and "Winslow" bearing the yard numbers 404, 405 and 406 and being 89%, 87% and 83% completed respectively on December 1st. These craft are of 1050 tons displacement, 29 knots speed and are driven by turbines of 18,000 horsepower.

The "Great Northern" and the "Northern Pacific" steel passenger and express steamers for the Great Northern Pacific Steamship Company. These boats were 95% and 85% respectively completed on December 1st. They are of 8255 gross tons, 23 knots speed and are driven by turbines of 25,000 horsepower. These two steamers were built under yard numbers 407 and 408.

The "Henry M. Flagler" a carferry steamer for the Florida East Coast Railway Company has just been delivered. The "Flagler" is of 2699 gross tons and is fitted with reciprocating engines of 2500 horsepower. Her yard number is 421.

The Maryland Steel Company of Sparrows Point, Maryland, completed and delivered the following tonnage during 1914:

Three freighters, the "Washingtonian," "Iowan" and "Ohioan," of 6649 gross tons, built to the order of the American-Hawaiian Steamship Company. These three steamers are engined with 4000 horsepower reciprocating engines, have a speed of eleven knots and held the builders' numbers from 131 to 133. Job numbers 138 to 141 inclusive represented four steel dump barges for the Panama Canal, each of 1000 gross tons. Numbers 142 and 143 were two steel lighters for the Pennsylvania Railroad. They are fittted with reciprocating engines of 345 horsepower, are of 549 gross tons and have a speed of 9.8 knots. The work on hand consists of two Panama Canal colliers with the yard numbers 144 and 145. These craft are named "Ulysses" and "Achilles," are of 10,550 gross tons, 14 knots speed and are engined with reciprocating engines of 7200 horsepower. They are 70 and 63 per cent. complete respectively at the present time.

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The Ball Room of the "Transylvania."

The "Transylvania"

A NEW Cunard liner invariably marks some fresh development or new feature in transatlantic shipping and while the new "Transylvania" is fully up to her predecessors in point of luxuriousness it is the method of propulsion employed which has attracted the widespread attention of marine engineers and naval architects to the latest addition to the Cunard fleet.

The public rooms include dining rooms, drawing rooms, smoking rooms, lounges and verandah cafe. A gymnasium is provided fully equipped with all modern apparatus. The state rooms are of large size and fitted up in the most approved style dictated by the company's long experience in the Atlantic trade. The heating and ventilating of the ship has received special attention. Steam heating the thermo-tank system and electrical fans are used in addition to a very perfect arrangement for utilizing to the fullest extent the natural facilities for obtaining fresh air in all parts of the ship. The main dining saloon has the usual large well with balustrade all around. The paneling is carried out in a buff color to harmonize with the blue draperies and the blue upholstery of the mahogany furniture. The lounge overlooks a wide promenade on each side of the ship. The lounge serves as an afternoon tea room or, the carpet being removed, as a ball room. It has a polished oak floor and the paneling is in olive wood relieved by sycamore stiles. The smoking room's decoration is carried out to express warmth and solidarity. The windows are fenestrated, the walls paneled in deep walnut and the floor laid in rubber tiling. Great open fire places add a touch of coziness. The public rooms for the use of second-class passengers are really duplicates of the first as far as comfort and accessibility are concerned and the same holds true of the second-class state rooms.

The "Transylvania" was constructed primarily for the Mediterannean trade, but war conditions have forced her into the Atlantic service. She is 567′ 0″ long, 60′ 6″ beam and 45′ 0″ molded depth. Her gross register is about 14,000 tons and her displacement about 20,000 tons. Accommodations are provided for 350 first-class, 216 second-class and 1858 third-class passengers. The vessel is expected to maintain a sea speed of 15½ knots while developing 9000 S.H.P. All water-tight doors below the water line are operated by the Stone-Lloyd system of automatic control which is operative from the bridge. Special steam winches are installed for handling the falls of the fifty lifeboats carried. Powerful steam winches and steam derricks are fitted at the hatches for cargo handling. Coaling is effected through the ship's sides, no less than 34 coaling ports and chutes being fitted.

Machinery.

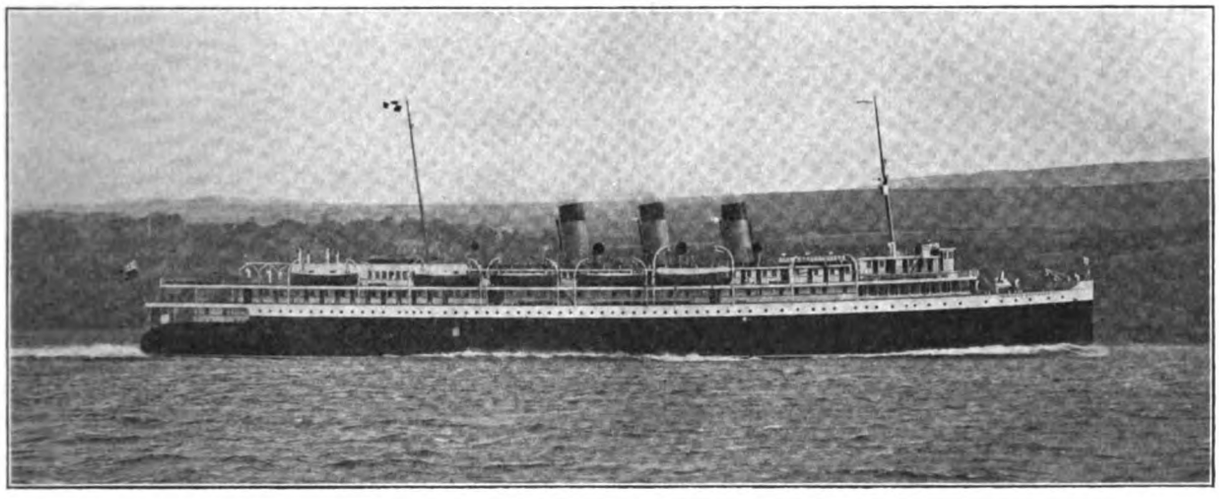
The installation of geared turbines, which heretofore have been applied only to smaller vessels, in a large Atlantic liner was an experiment attracting much attention. The opinion of the technical observers of the "Transylvania" during her trip from the Clyde to Liverpool was wholly favorable. Geared turbines not

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only require less engine space, but serve to propel the vessel with remarkable absence of noise and vibration, and it was declared that hereafter all vessels of any importance would be engined on this principle.

The twin screws are driven by turbines of the Parsons' type working through reduction gearing. The gear wheels are about 10 feet in diameter and 5 feet in breadth, each driven by two turbines working in series, and running at about 1500 revolutions per minute. An astern turbine of the impulse reaction type is incorporated with each low pressure ahead turbine. The arrangements are such that either the high pressure turbine or the low pressure turbine can be used independently, so that the derangement of one turbine will not prevent the vessel proceeding on twin screws. A complete system of forced lubrication is installed for all turbines and gear wheel case bearings. The auxiliary machinery includes three independent electric generators, evaporators, with a combined capacity of 100 tons of fresh water per day, and a large installation of refrigerating machinery. Special electrically driven fans are fitted overhead in the engine-room drawing air through trunks from the boat deck, and distributing it uniformly throughout the engine-room, stores, and work shop, providing excellent ventilation for the engine room, etc. A complete and independent electric lighting set for emergency purposes is fitted aft on the poop.

The boiler installation consists of six large double-ended Scotch boilers working on natural draft with a pressure of 210 pounds, arranged in two groups of three each in separate boiler rooms.



The "Princess Margaret" on her trial run.

The "Princess Margaret" and "Princess Irene"

THE contract for these two vessels was let to Messrs. William Denny and Brothers, of Dumbarton, Scotland, on the 24th May, 1913.

Length over all,	395 feet.
Breadth molded,	54 feet.
Depth molded at side,	20 feet to main deck.
	28 feet to upper deck.

They are constructed of steel, and in accordance with the requirements of British Corporation B. S. Class, with freeboard, and under special survey. They have five decks—boat, promenade, upper, main and orlop—with deck houses on the boat deck, which includes a first-class smokeroom.

The vessels have a straight stem, cruiser stern, and a flat keel. They are fitted with electric light, wireless telegraphy, refrigerating machinery, and use oil as fuel.

These vessels have cellular double bottoms, and are subdivided according to the very latest and best practice. There are no less than fourteen transverse bulkheads, two of which extend to the upper deck, and for a distance of 71 feet on each side, abreast the boilers, there is a longitudinal bulkhead some 7 feet away from the outer skin. These longitudinal compartments also have transverse divisions, and are arranged to carry the oil fuel. All watertight doors are operated from the bridge. The general subdivision is such that in the case of a collision or damage, any two compartments may be thrown open to the sea, and the vessel still stay afloat, although she may be loaded.

Primarily intended for passenger service, these vessels are not designed to carry a large amount of freight. They have cargo space for about 500 tons in the fore-hold and the 'tween decks. A freight elevator is fitted for hoisting cargo from the lower hold to the main deck, and from there it is handled through the side ports, which are unusually large. Special arrangements have been made for accommodating motor cars.

The general arrangement of these ships is similar to the "Princess Charlotte," now in the Canadian Pacific Railway service on the triangular route between Vancouver, Victoria and Seattle. First-class sleeping accommodation is provided for about 430 passengers, in about 200 staterooms. These rooms are fitted up in the most modern style, most of which have double and single berths, some with additional sofa berths, and many cabins de luxe with bedsteads, connecting bath rooms, etc., etc., these latter cabins being finished in hardwood, and with special decorations. Every stateroom in the ship has hot and cold running water, electric lights, steam heat, and also arranged for portable electric heaters.

A very handsome observation room has been arranged forward, similar to the vessels now on the Coast, and aft, there is on the starboard side a very handsomely furnished writing-room, and on the port side, a tea room.

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These are opposite each other, and glass divisions form part of the design, thus giving a complete view from side to side of the ship. Further aft, a comfortable lounge has been provided for the exclusive use of ladies.

A first-class smoke room is on the boat deck aft. It is spacious, well ventilated, and fitted up in the most modern style. Outside of this room is an extension of the veranda-cafe order, and will doubtless be well patronized in fine weather.

The dining saloon is located on the main deck aft, runs from side to side of the ship, and is lighted by Utley's semi-rectangular port lights, of very large size. Dining accommodation is arranged for about 185 persons, at small tables.

The galley and pantry arrangements are immediately forward of the saloon, and are fitted up with all modern conveniences.

There are ample bath rooms and lavatories on all decks. Second-class accommodation has been provided for about 80 passengers, on the orlop deck forward, and equipment is provided for about 2,000 passengers for day excursions. Fifteen lifeboats and one motor lifeboat are under davits on the boat deck. Electric winches for hoisting the boats, are provided. A gas-driven emergency dynamo has been installed, and is located on the boat deck, and of a capacity sufficient to operate the boat winches, wireless, and a fair proportion of the lights in the ship, should the main dynamos, which are located in the engine-room, go out of business through any cause.

The motive power of the ship consists of ten Babcock and Wilcox boilers of 33,000 square feet of heating surface, fired with oil fuel under forced draft on the closed stokehold system. The twin screws are driven by two sets of Parsons geared turbines, operating on the compound principle. The propelling machinery consists of two independent sets of Parsons compound steam turbines, each set comprising one H. P. ahead turbine, one L. P. ahead turbine, one astern turbine and one set of gearing, each set driving one shaft and one propeller. The astern turbine is fitted in the after end of L. P. casing, and is of ample size, and has an impulse wheel at the inlet end. A flexible coupling is fitted between each turbine and its companion shaft, and a by-pass valve is fitted to H. P. turbines for cruising ends for economical work at slow speeds. The geared turbine system has the advantage of higher efficiency for the turbines, which are allowed to run at a high rate of speed, and which allows the propellers to turn at a slower and more efficient speed for driving the ship. It has a further advantage of allowing larger propellers to be used, which gives a better control in handling the vessel in and out of harbors or docks. The geared system effects a considerable saving in fuel, and is now being adopted in many new vessels which are being built for trade in all parts of the world.

The auxiliary machinery is very complete. The condensers are of the Weirs uniflex type, and have a total cooling surface of 11,000 square feet. The air pumps are of Weirs dual express type, and have both wet and dry pumps of sufficient capacity to maintain a vacuum of 28 inches, while the turbines are developing full power. There are four of Weirs' latest improved double-acting feed pumps, of ample size. The usual bilge and deck pumps, and sanitary pumps are provided, and an evaporator of twenty tons' capacity, is also fitted. The electric generating plant consists of three similar units, each of 60 k.ws. of the turbine-driven type. Nearly 2,000 electric lights are provided.

These vessels were designed for a speed on service of 21 knots. During the trials of the "Princess Margaret," which were made on October 22, over the Skelmorlie course, firth of Clyde, the engines indicated over 14,000 H. P., and on a mean of runs on the measured mile, she showed a speed of 23.15 knots, and for six hours maintained, without the slightest difficulty, a speed of about 22½ knots.

NOTICE TO STEAMSHIP LINES.

1. Articles XIII and XIV of the Rules for the Measurement of Vessels for the Panama Canal, set forth what space may be used for carrying coal and other fuel for a vessel's own use without payment of tolls for the space so occupied.

2. The rules are liberal in making ample provision for such space and authorize the owner of the vessel to select either of the two provisions that he may elect as set forth in the rules. Full tolls are levied on loaded vessels and reduced tolls on those in ballast, and in order that there may be no misunderstanding vessels will be considered in ballast only when they carry no passengers and do not carry either coal or merchandise of any description in any quantity whatsoever except bunker coal or other fuel for their own use. In order that they may be entitled to claim the reduced or ballast rate the amount of bunker coal or other fuel must not exceed in volume the allowance specified in the Panama Canal certificate as the deduction for bunker space.

3. In any case in which the amount of coal on board exceeds the deductible allowance the vessel will be charged full tolls.

4. In any case in which coal be carried as a deck load, for the vessel's own consumption, or even though it be within the deductible allowance it will be subject to measurement and charge, the rate depending upon whether or not the vessel be considered in ballast or loaded.

5. If when carrying a deck load of coal for her own use she carries no passengers or freight, and the amount of coal on board be within the deductible allowance, she may be considered in ballast.

6. Vessels that wish to benefit by the reduced or ballast rate of tolls should be very careful not to carry more than the deductible allowance under the rules.

7. On arrival vessels must have ready a statement of their coal account, to which the master may be required to take oath. In case coal be carried outside of the regular bunkers, both it and that carried in the bunkers should be piled or arranged in a fairly uniform way so that it may be readily measured.

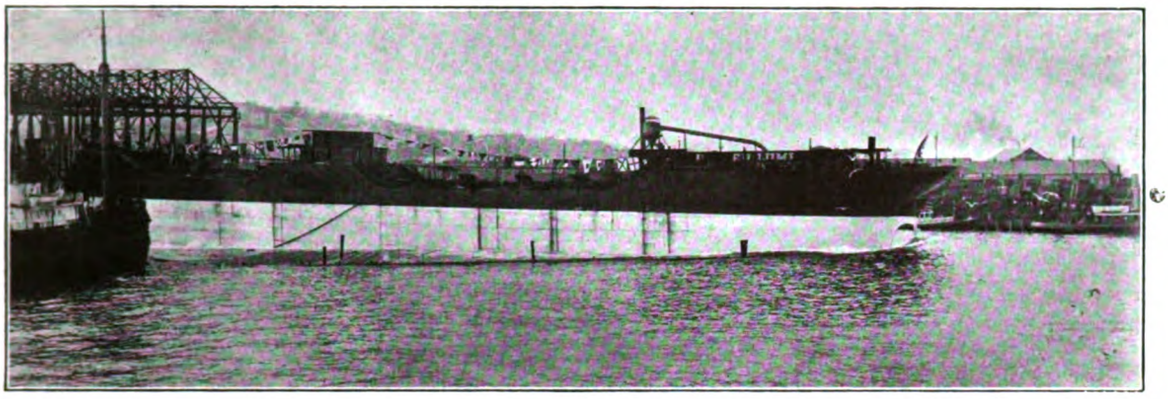
GEORGE W. GOETHALS, Governor.

ERRATA.

In our December number in the description of the "Lyman Stewart," page 33, appears the following: "The refrigerating plant is of the Vulcan Iron Works' make, of two tons' capacity on the direct expansion system." This is in error, as the installation is an Audiffren-Singrun Refrigerating Machine and was installed by the H. W. Johns-Manville Company through their San Francisco branch.

The Bureau of Supplies and Accounts of the Navy Department recently called for bids for the transportation of one to four cargoes of coal to San Diego and/or Tiburon. D. B. Dearborn and Company offered the John A. Hooper and the Peter H. Crowell with capacities of 3200 and 4300 tons respectively at $4.95 per ton, which offer was accepted.

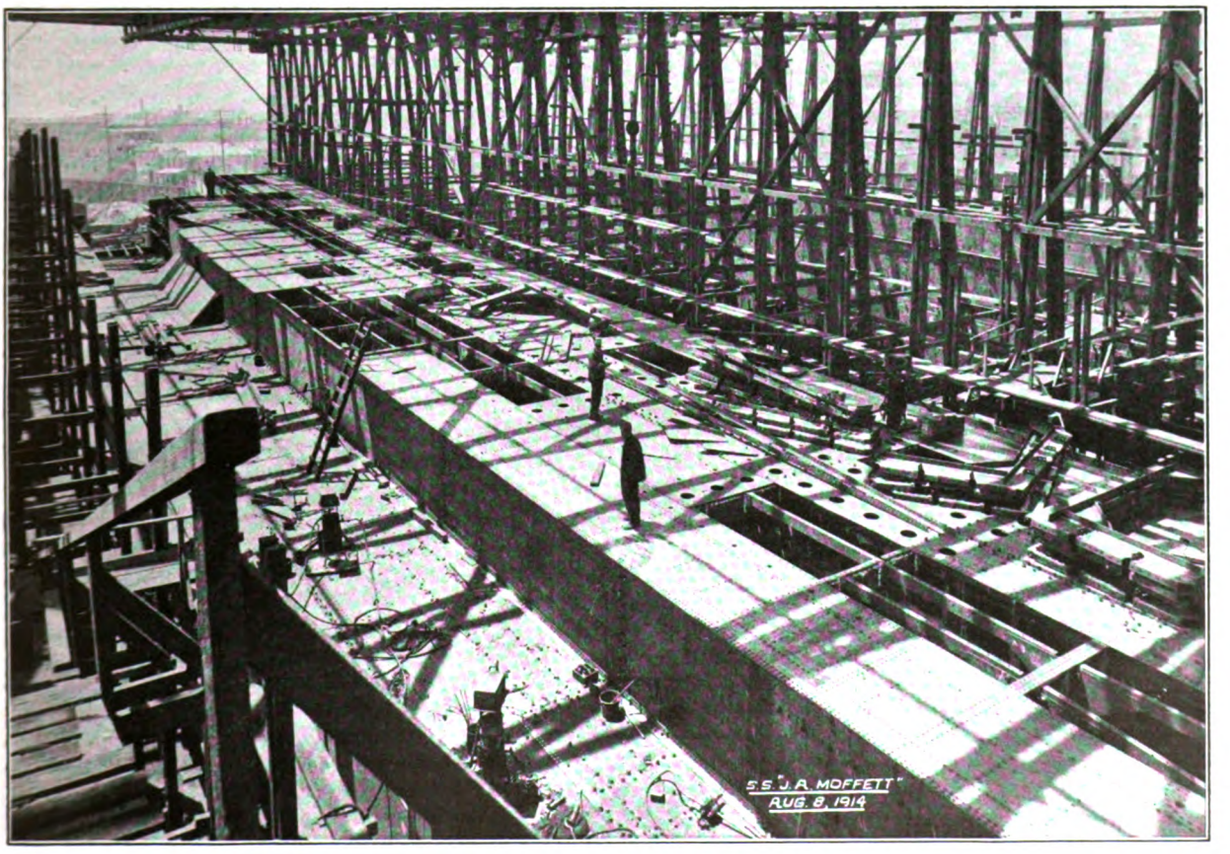
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The Launching of the tanker "J. A. Moffett."

The "J. A. Moffett" Launched

The oil tanker "J. A. Moffett," built to the order of the Standard Oil Company, was launched at the Union Iron Works on December 5th. This vessel is the third bulk oil carrier to be put into the water by the Union Iron Works this year, and is practically a sister ship to the "Frank H. Buck" and the "Lyman Stewart." She is built on the Isherwood system and the principal dimensions are as follows: Length over all 435′, beam 54′, depth molded 31′ 6″, load draft 27′, and displacement at this draft 14,075 tons. Her propelling machinery will consist of a vertical, inverted triple expansion engine of 3000 h.p., and she is expected to make slightly better than 11 knots on trial. Like her predecessors, the "Moffett" was turned out in a very short time.



A view of the "Moffett" during construction.

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AN INTERESTING RIVER BOAT.

The river steamer "Shu-Hun" recently constructed by Messrs. Yarrow & Company, Scotstoun, Glasgow, for the Szechuan Steam Navigation Company possesses many points of interest. The vessel was built for passenger and cargo service between Ichang and Chungking on the Yangtse River. This is about a 400-mile voyage and is very dangerous and difficult navigation owing to rapids and whirlpools, the position of which changes with the rise or fall of the river. The small steamers hitherto operated on this route have been warped up stream through the rapids by means of hawsers taken on shore. Captain S. C. Plant, one of the oldest navigators on the river, determined to design a craft that could negotiate the rapids under her own steam. To achieve this end it was necessary that the steering capabilities should be such that there would be no possibility of the vessel's head sloughing around when entering a rapid.

It was finally decided that a length of 190 feet, and a beam of 30 feet was the largest size vessel which could safely navigate the rapids on a draft of 5 feet, when the load of cargo was 300 tons, and the "Shu-Hun" was accordingly built to these dimensions, and with machinery of 2,000 indicated horsepower. Another feature conducive to the success of the design was the fitting of the tunnels, in which the twin-screw propellers work, with Yarrow's patent automatic hinged flap, arranged to give the maximum efficiency of propulsion in all conditions of load. It has, of course, been long a practice for vessels of this type to be driven by screws working in tunnels; but the introduction by Messrs. Yarrow, of the hinged flap very materially increases the efficiency of this system.

The steering-gear, consists of three balanced rudders actuated by hand and steam. There are two steam steering-wheels, one in the wheel-house and one on the upper bridge, and the hand-gear is also in the wheel-house. The steering-engine is in the main engine-room. The vessel turns within two lengths, with both engines working at half-power.

The hull of the "Shu-Hun" is divided into nineteen compartments by transverse and longitudinal bulkheads, and water-tight doors are also fitted to the bunker bulkheads as damage to the hull of vessels on this river more frequently occurs at the turn of bilge than on the bottom of the vessel. There are four decks in all, viz., main deck, upper deck, boat-deck, and awning deck. The accommodation for European passengers and the officers is on the boat-deck, and consists of a dining-saloon, eight two-berth staterooms for passengers; also captain's, chief officer's, and chief engineer's cabins, pantry, galley bathroms, and steward's cabin. The accommodation on the upper deck is for the Chinese first and second-class passengers, and consists of a first-class saloon with dining-tables, and eight first-class two-berth cabins; a second-class saloon and 11 four-berth cabins; also purser's cabin and office, and assistant purser's cabin. On the main deck there is accommodation for 170 Chinese steerage passengers, 15 firemen, and three Chinese engineers. In the forecastle there is accommodation for four petty officers and 12 men, and there is also a mess place for 14 cooks and boys.

The vessel is lighted throughout with electric light, the current being supplied by an oil-driven dynamo, so that it is not necessary to keep up steam when the vessel is moored for the night. There are five separate holds for cargo, having a total capacity of about 16,000 cubic feet, and on a draft of 5 feet the steamer has a dead-weight capacity of about 300 tons.

The main propelling machinery consists of two sets of triple-expansion surface-condensing engines, balanced on the Yarrow-Schlick-Tweedy system. Piston valves are fitted to the high-pressure, mean-pressure, and low-pressure cylinders. The link motion is of the twin-bar Stevenson marine type, with adjustable bearings. All the bearings have large surfaces, so as to ensure satisfactory results with these engines when running at somewhat higher revolutions than those usually adopted for this class of vessel.

In the closed stokeholds are fitted two Yarrow patent double-ended water tube boilers, each boiler being fitted with an independent funnel. These boilers are designed so that, if at any time an overload power is required, it can be quickly obtained by burning oil fuel in conjunction with coal.

The efficiency of the propellers depends upon their working in solid water, and it is, therefore, important that when the propeller starts revolving in the funnel, and the air is forced out and water takes its place, there shall be no leakage back of air. The after part of the tunnel must project below the surface of the water, even when the vessel is at its lightest draft. The forward part of the tunnel forms part of the hull in the usual way, but the after part is hinged at point about the centre of the tunnel, and the flap is balanced by means of weights attached to the end of a chain, which passes over pulleys and is secured to the end of the flap. By this means the flap automatically regulates itself.

Throughout the trials of the "Shu-Hun" the machinery gave every satisfaction, and practically no vibration was felt in any part of the ship at any speed. The double-ended Yarrow water tube boilers provided an ample supply of steam without recourse to oil fuel in conjunction with coal. The vessel has made several voyages, and in each case crossed the rapids without the aid of hawsers. She has broken all records in the run from Chungking to Ichang and back. She did the round trip of 800 miles in 5½ days, and this against a strong freshet, the water in the gorges during the short run up of under 44 hours' steaming was from 13 feet to 35 feet.

IMPORTANT NOTICE.

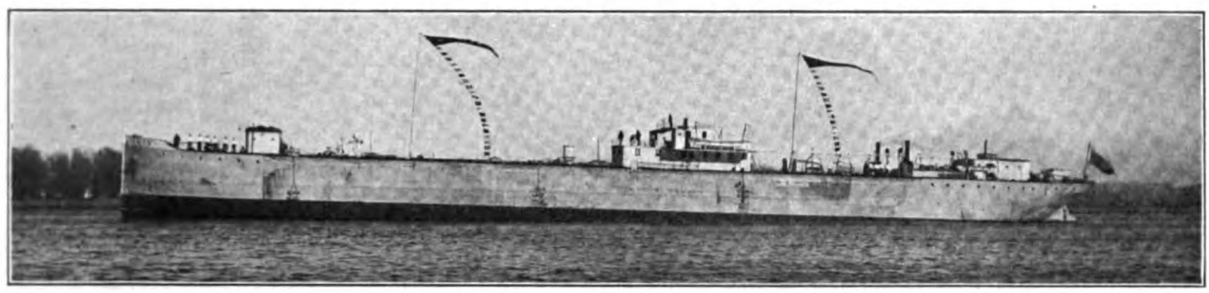
The Commissioner of Lighthouses has announced the two following important changes which will be of interest to all sea captains and ship officers on the Pacific Coast:

On or about February 15, 1915, the fog signal at Point Reyes light station will be changed to an air diaphone, to sound one blast every 45 seconds; blast 5 seconds duration.

Also on or about March 1, 1915, the light at Diamond Head light station will be changed from fixed white to group occulting white; 2 occultations every 10 seconds.

The country of greatest natural wealth in South America is Brazil and it is a country so situated that the United States should trade naturally with it. There is a large trade between the United States and Brazil but it is only a percentage of what it should be. As long as our rivals carry our goods to market there can not be much hope of improvement. The shipping statistics of the great South American republic for 1913 illustrate just what part the American vessel plays in our foreign trade. In 1913 there were 27,782 entrances into Brazilian ports with a combined tonnage of 29,170,-179, of these 13 were American with a combined tonnage of 39,505. In other words we were represented by less than one-twentieth of one per cent. of the entrances and less than one-tenth of one per cent. of the tonnage.

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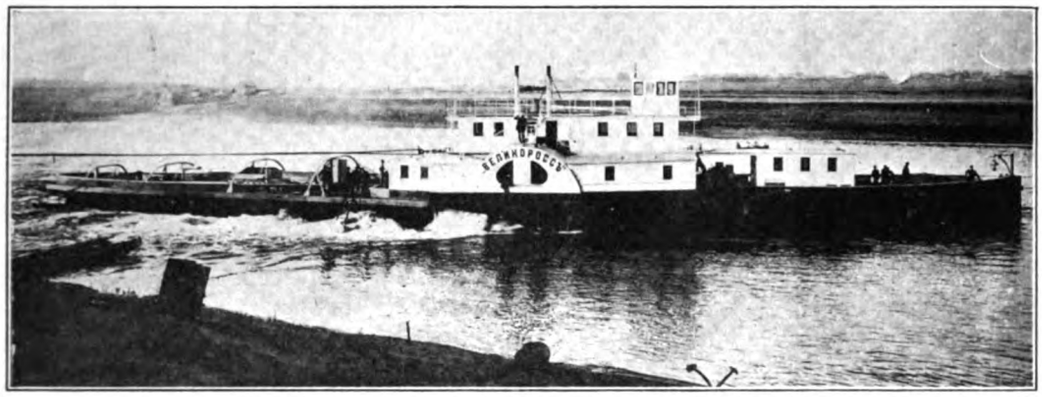
The Russians were the pioneers of motor ship construction.

Slipping Clutches for High-Power Transmission

By J. RENDELL WILSON.

SOME years before the Diesel engine was regarded as a practical propulsive power medium for vessels of large tonnage in Western Europe and America, there were some forty ships with an average horse-power of about 600 in service in Russia, the first having run her trials in 1904. There were then many rumors current regarding Russian motor ships, but nothing definite was known, or even believed, and it may be remembered that I was the first (in January of last year) to reveal the true state of affairs to American engineers by publishing actual photographs and details. Craft of 1000 B. H. P. were afloat before the reversible Diesel engine was a success, consequently it was necessary to install a mechanical mechanism that not only would allow of the reversal of the propellers; but which would allow the propeller speed to be varied from zero to full revolutions without slowing down the engine. Thus the outlook only leaned towards a mechanism that would absorb the power of the engine when required, yet under ordinary running conditions absorb virtually no power at all. The first few motor ships were fitted with the Del Proposto electrical transmission; but this, I believe, absorbed too much power at that stage of its development, and very shortly the Kolomnaer Co. adopted the Koreiwo slipping clutch, and this was found to give such satisfactory results that it was retained even with reversing oil-engines of 600 B. H. P. each. Electrical transmission is being used with a large Diesel driven revenue cruiser launched over a year ago at Nicolaieff; but when I last heard of her she was not in service owing to a delay in connection with the installation of the electrical gear. Electrical transmission is also used in connection with the Diesel engines of the Amur River motor gunboats, and the old Russian cruiser "Ruenda," which has been converted to motor power.

A large number of the Russian motor craft are side paddle-wheel tugs, others are screw-driven cargo and tank ships, and for each type of vessel the Koreiwo clutch is applied; but the design differs as the conditions of service vary. I will first deal with the clutch designed for screw driven ships. To each engine were fitted two clutches, one at each end, shown by (B) and (C) in Fig. I, the clutches also forming flywheels. In the ordinary way the clutch (C) is thrown out of engagement, the clutch (B) forming a direct connection to the propeller enabling, by slipping, the turning speed of the shaft (D) to be varied as desired, whilst the reversing shaft (F) rotates idly. To reverse the propeller shaft the after clutch (B) is thrown out of engagement, and the forward clutch automatically engages. Connected to the clutch (C) is the pinion (E), which drives, by means of the chain (M), the shaft (F) that runs alongside the engine, and, as this shaft is connected by gearing (S) to the propeller shaft (D), the latter is turned in the reverse direction for running astern: while the engine runs ahead as the shaft (D) is running free of the engine.



An Internal Combustion Engined Side Wheel Tug.

The construction of this clutch can be seen by referring to Fig. 2. The flywheel (C) and the clutch-casing (D) are keyed to the engine crankshaft; and, contained in the casing (D) is the other half of the clutch, the latter being carried on the boss (E), which is keyed to the propeller shaft.

Annular copper diaphragms (H) are fitted to the inner plates of both faces, and under these diaphragms are spaces connected to compressed air bottles by valves and piping. Over the diaphragms are fitted thicker,

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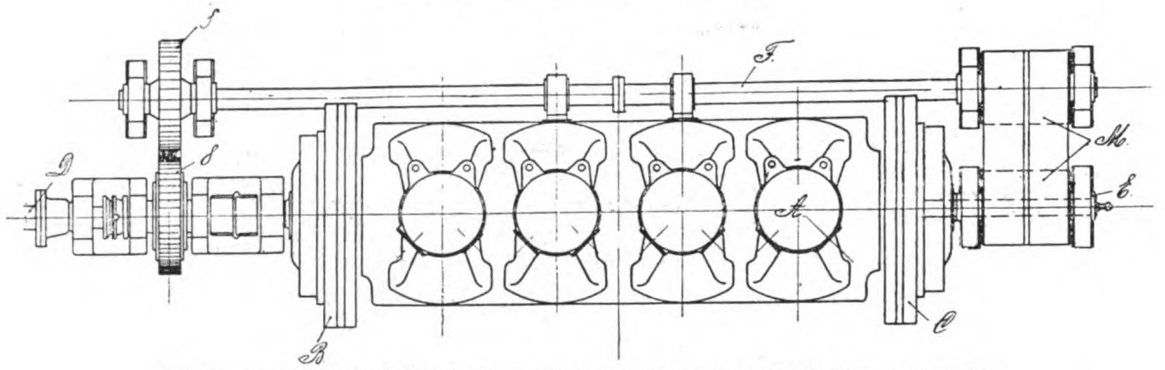


Fig. 1. Arrangement of Clutch and Reverse Gears for screw Diesel driven motor ship.

but similar, plates, while on the latter are fixed solid rings carrying lignum-vitae strips, shown by (L). To the interior faces of the flywheel (C) and casing(D) are fixed copper rings (F), and in the faces of the lignum-vitae strips are cut radial channels, allowing water to flow from the pipes (N) into the interior of the casing (D), when it is thrown by centrifugal force into the inner periphery. From there it flows through the channel (B) to the flywheel rim at (R) inertia then forcing it through the exit pipe (O). Immediately the air pressure under the diaphrams is released by shutting off the inlet valve, the clutch no longer grips, as the lignum-vitae strips do not touch the copper rings. To bring the clutch into operation again the air is admitted and short springs transmit the pressure to the lignum-vitae strips, which contact with the copper rings and the clutch.

A manometer is sufficient for regulating the clutch as the gripping-power is controlled by the air pressure under the diaphragms, also because a continued surface lubrication is maintained by the constant coefficient of friction. And so the gripping can be varied from nil to full power. The lignum-vitae strips and copper rings being well water-lubricated will stand almost any amount of wear, even up to a load of 350 pounds per square inch; but the face pressure to be transmitted with engines of 500 B. H. P. is usually under 130 per square inch. Under actual working conditions it has been found that the wear is very slight indeed. With a 500 B. H. P. engine the air pressure at full speed is 37.7 pounds per square inch, and as the ratio between the lignum-vitae and the diaphragms is 3.5, the pressure between the two contacting surfaces cannot exceed 128

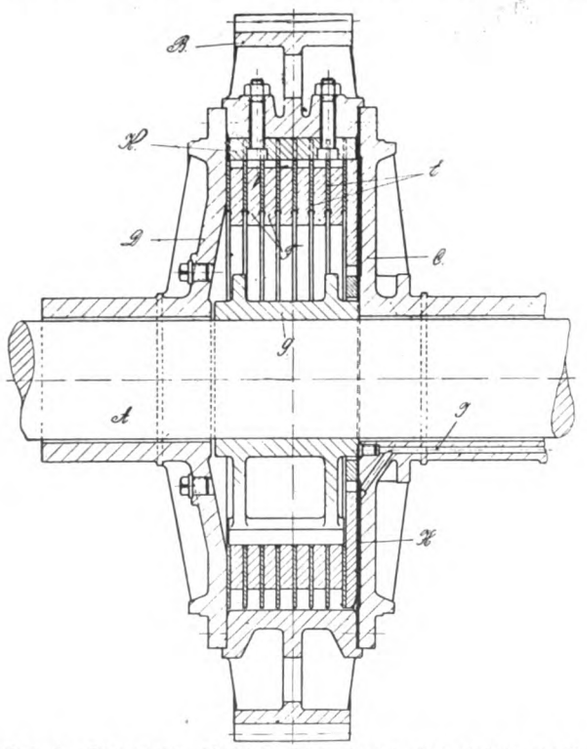


Fig. 4. Pneumatic Multiple-Disc Clutch for paddle shaft.

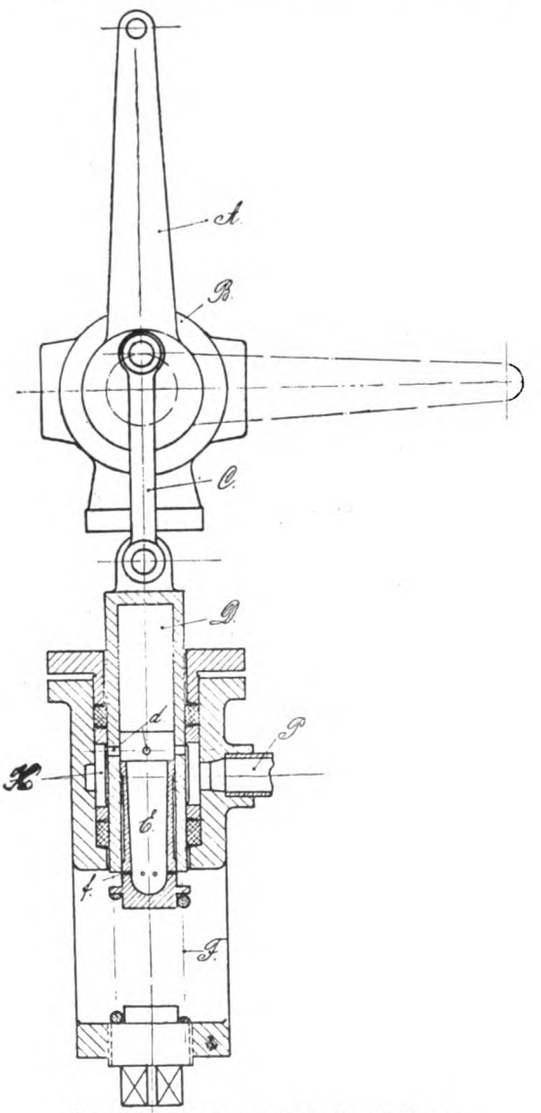


Fig. 5. Air control valve for clutches.

pounds per square inch. Even then the drive is direct at this pressure and there being no slip there is no wear.

When maneuvering the ship the engine is usually reduced to half-speed. When the clutch is slipping, and the engine throttled down as low as possible, the pressure would only be about ten pounds per square inch between the two frictional faces, and the air pressure

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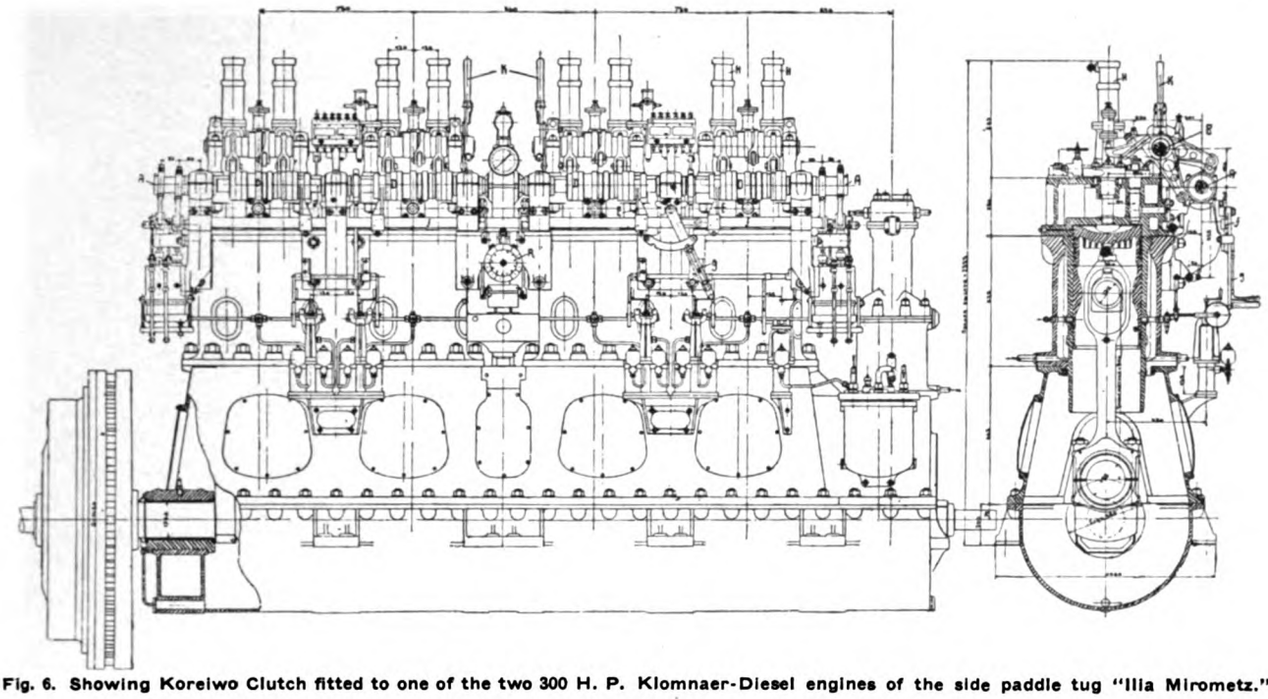


Fig. 6. Showing Koreiwo Clutch fitted to one of the two 300 H. P. Klomnaer-Diesel engines of the side paddle tug "Ilia Mirometz."

behind the diaphragm under 3 pounds per square inch. However, it can be taken that the average frictional pressure when maneuvering is about 50 pounds per square inch. It may be held forth that when the vessel is moving slowly the engine is running at full speed, consequently the general fuel consumption is high; but in reality the clutch is only slipping for very short periods, and when required to run at a reduced speed for any length of time the engine is throttled down. Consequently the absorption of power by the clutch little affects the fuel consumption.

As before mentioned, the clutch system adopted with the side paddle-wheel tugs is somewhat different. These tugs vary in power from 300 H. P. to 800 H. P., in some cases there being two engines to the one paddle-shaft. Needless to say the engines are installed 'thwartships, and Fig. 3 shows the arrangement for one motor, while Fig. 5 illustrates the air control to which I will refer presently. Turning to Fig. 3 the four-cylinder Diesel engine is depicted by (A) and the paddle-shaft by (D). For the ahead motion the clutch (C) is thrown out and the extension shaft (F) with its chain driving, and driven, pinions (M) does not rotate idly, but remains stationary, while the clutch (B) is in engagement and it will be noted drives the paddle-shaft (D) by means of the gears (S) in the opposite direction to that in which the engine is turning, thus the vessel goes ahead. To run astern, the clutch (B) is thrown out, and the clutch (C) into engagement, consequently the chain drive (M) turns the paddle-shaft in the same direction as the rotation of the engine, and the vessel goes astern. When both clutches are thrown open the paddles remain stationary.

The type of Koreiwo pneumatic clutch installed at each end of the engine is similar to the one just described; but the chain gear-wheel (M) contains a special multiple disc pneumatic clutch shown by Fig. 5, it being in an oil tight drum. Its use is to enable the chain drive (M) in Fig. 3 to remain stationary while the gear (S) and the paddle-shaft (D) are driving the vessel ahead. Also it is so arranged that it comes into action automatically with the astern movement. Its construction can easily be followed by referring to Fig. 4. On the

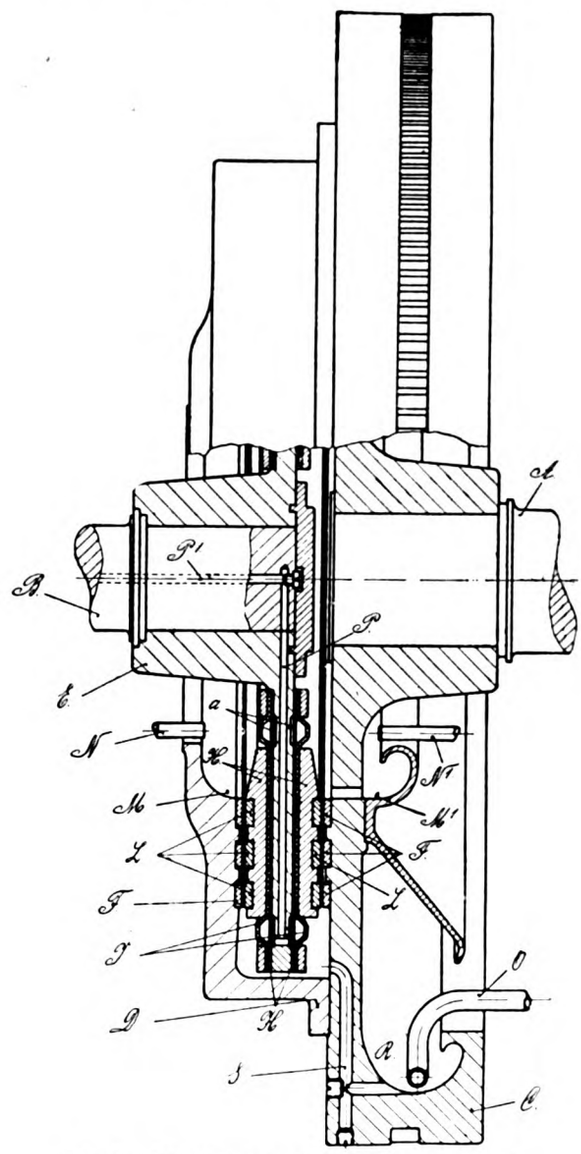


Fig. 2. Section of Koreiwo pneumatic clutch.

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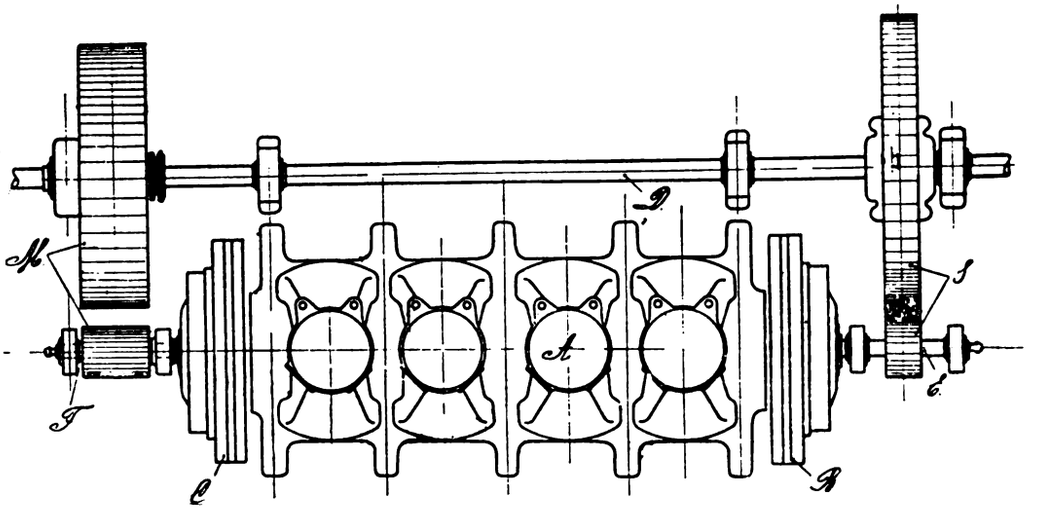


Fig. 3. Arrangement for side paddle wheel tug.

hub (G) of the paddle-wheel (A) and the pinion (B) are keyed the two sets of discs (E) and (F). A diaphragm (H) is fitted against the flange (C) forming an air-tight space, which can be fed with compressed air via the channel (T). The discs (F) rotate freely with the shaft (A) when there is no pressure under the diaphragm, but engage when the air is admitted at (T).

We now come to Fig. 4 which is a valve for controlling the supply of compressed air to the three clutches. The lever (A) controls a three-way cock (B) and a forward and astern movement raises the plunger (D) by means of the rod (C). This plunger is hollow and its body is always in connection with the compressed-air storage bottle; air being admitted through (P) and the chamber (K) and the ports (d). At the lower end of the plunger (D) works a piston-valve (E) with air-ports (f), and a spiral spring (F) maintains this in position. When the lever (A) is moved to and fro, the plunger (D) moves up and down, thus closing or uncovering, the ports (f), as the case may be. At the same time the three-way cocks admit air to one of the clutches. When the pressure in the clutch rises, the resistance of the spring (F) is overcome and so the air pressure on the piston-valve (E) moves the latter until the ports are again uncovered. Between the air-pressure and the spring (F) a balance will occur at any position of the controlling lever, and so a pressure variation in the clutch can be obtained. It will be seen that the whole of the system of transmission gear and clutches is almost simple enough to be crude, yet it is undoubtedly clever and well thought out. Without its adoption and aid it is not likely that there would have been many large motor ships in Russia at the present time, instead of nearly one hundred.

On the first of December the Shipmasters' Benevolent Association of the United States perfected their organization and elected the following officers: President, Captain Frank White; first vice-president, Captain Fred Warner; second vice-president, Captain Henry Cann; third vice-president, Captain T. W. Garlick; fourth vice-president, Captain Gus Nord; executive committee, Captains J. F. Blain, O. J. Humphrey, John A. O'Brien, M. M. Jensen and George W. Morgan.

The Chamber of Commerce and other bodies of Seattle and San Francisco have protested against the practice of giving work to Navy Yards on competitive bids.

TUXHAM ON "MALAKKA."

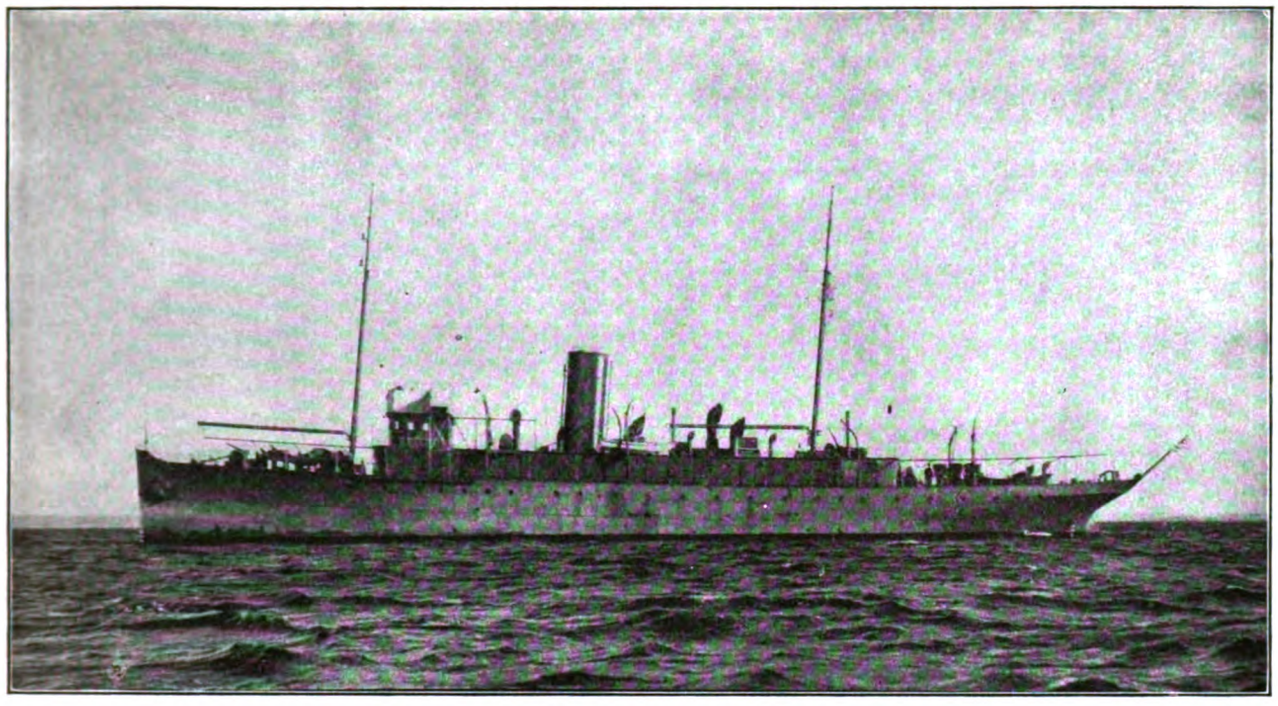
One of the interesting things on board the motorship "Malakka," a recent visitor to San Francisco, was the efficient Tuxham-driven electric light set. This Semi-Diesel is known as the "trouble fixer," as it may always be depended upon and develops 18 horsepower with water injection. During the vessel's stay in this port, California oil of 21 degrees baume was used in the Tuxham electric light engine with excellent results. Messrs. Petersen and Schmiegelow, the local agents for the Tuxham engine, report that considerable interest is being manifested in the machine by local engineers. The Tuxham is extremely simple in design, has practically nothing on it that is capable of giving trouble and will burn nearly anything in the way of fuel oil that the fuel pumps will handle.

A BIG DIESEL.

Messrs. Harland and Wolff of Belfast have just received a Diesel engine from the Winterthur works of Sulzer Brothers which will be the largest Diesel engine in commercial operation. This motor, which will drive a dynamo, is a six cylinder machine of the two cycle type. It is of marine pattern and similar in essentials to the smaller motors that were installed in the motor ship "Monte Penedo." The speed of the motor is 132 revolutions per minute. In this type of engine no cylinder valves are used for scavenging but the scavenging air is admitted through two sets of ports, one being opposite the exhaust port at the bottom of the cylinder and the other an auxiliary set slightly above the main, to which the admission of air is controlled by valves operating the cam shaft. It is stated that the tests of this large engine have been very satisfactory and that the method of scavenging has proven quite suitable to such a high power.

A reinforced concrete pontoon for a landing stage for ferry service, has recently been put into use in Sydney harbor, Australia. The pontoon is 160 feet long, 43 feet wide at one end and 68 feet wide at the other, seven feet nine inches deep and has a freeboard of twenty-two inches. The bottom of the pontoon is flat and the sides and ends are sloped to an angle of 70 degrees.

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Submarine Tender "Fulton," America's largest Diesel Engined Ship.

Trials of Submarine Tender "Fulton"

ON October 31st and November 1st the "Fulton," the first submarine tender built for the United States Navy, was given her official trials, which proved most successful. The "Fulton" marks another step forward in the development of the Diesel engine in America and her performance is of interest to all who are watching the rapid progress of this remarkably economical type of power. But, aside from her power plant, the "Fulton" is an interesting vessel. She was designed with three objects in view—to furnish a fuel and store ship; to provide a mother ship upon which the officers and men of the flotilla may live when not actually engaged upon the submarines; and to provide a repair ship upon which minor work can be done. The attempt to satisfactorily fulfill these three requirements resulted in some peculiar features, which were well worked out by her designers, the New London Ship & Engine Co., of Groton, Conn., and Seattle, Wash.

It has always been the practice of the United States Navy Department to build its major ships to its own very stringent specifications. In the case of such auxiliaries as colliers, tenders, etc., which follow mercantile more closely than naval design, the specifications of Lloyds, the Bureau Veritas, or the American Bureau of Shipping, are accepted. The "Fulton" is in general built to the latter.

A general description of the vessel is given below:

Length overall, 226′ 6″.

Length on water line, 216′ 0″.

Breadth molded, 35′ 0″.

Depth molded, to upper deck at center line at one-half length, 24′ 3″.

Draft, trial load, 12′ 11½″.

Complement (officers and crew), 190.

The vessel has a complete upper deck, a complete berth deck and platform decks at the ends. Upon the upper deck is a continuous steel deck house, with a pilot house on top of the forward end of same. The stem is straight and the stern elliptical. There are two pole masts with derrick booms served by winches.

The double bottom spaces are used to carry fuel oil and reserve feed water. The hold contains fuel oil tanks, store rooms and ammunition room. On the platform deck are store rooms and torpedo magazine, forward, and crew's space aft. Over the engine room on the berth deck is a machine shop, with a torpedo testing room immediately forward. The machinery space is in the hold amidships.

The deck house contains a cabin for the captain and division commander and their staterooms and bath, with a large office equipped with typewriter, table and filing cabinet for each submarine and a large drafting board. Beyond these rooms there is a sick bay, captain's galley and pantry, bake shop, quartermaster's and bosun's stores, engine room air shaft, and, extending the full width of the after end, the ship's galley, which is open to the outside air except for a netting, but provided with canvas curtains and light steel shutters.

In the crew's quarters, aft on the main deck, there is additional accommodation for 100 men, or the entire crew of five submarines. The wardroom is under the deck house forward and from it open the staterooms, while forward of these there is a toilet room, with two bathtubs and a shower bath, for the use of the wardroom officers.

The vessel is lighted throughout by electricity, and heated by steam, the steam for heating, as well as for operating the anchor windlass, steering engine, and towing machine, being furnished by a small oil-burning boiler forward of the main engine.

The machine shop is equipped with the necessary lathes, drill presses, shapers, milling machines, etc., for making the usual routine repairs on submarines. In

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addition the foundry and blacksmith shop contain a furnace and blacksmith and foundry outfit.

The main engine is a two-cycle, vertical, single-acting Diesel motor of the Nlseco type, designed and built by the New London Ship & Engine Co. There are six working cylinders and two air compressors, the aggregate power being about 1000 h.p. at 260 revolutions.

The working cylinders and air compressors are on the same line, the compressors being driven from the crankshaft. The control station, at the forward end, consists of a hand wheel by means of which the engine is started, stopped or reversed.

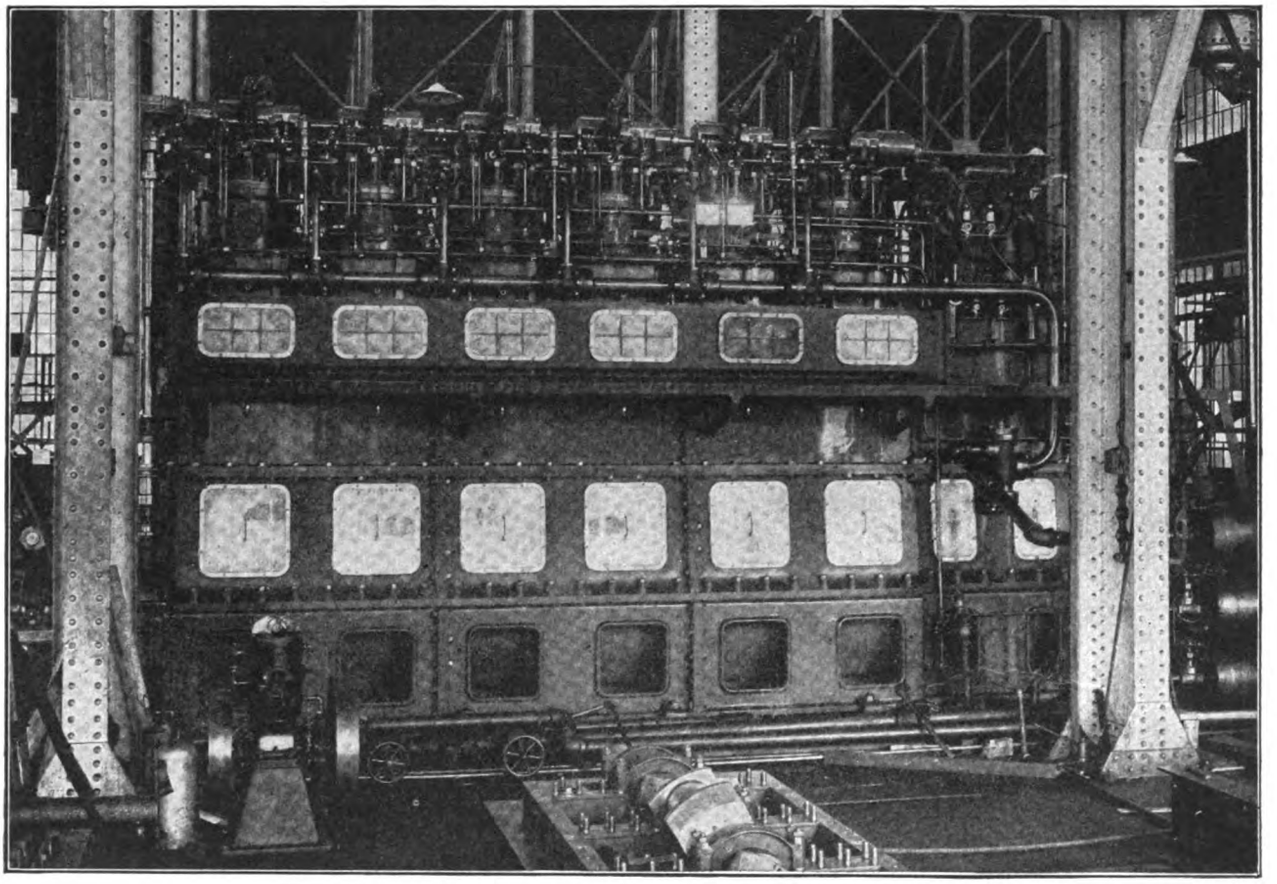
The air compressors are two-stage, with cooling coils between the first and second stages and the second stage and the spray flask, into which the compressor discharges. There are additional starting flasks, connected both to the engine compressor and to the ship's high pressure air line. Air from the spray air flask passes to the spray valve in the working cylinder head.

The working cylinders are each provided with a spray valve, a relief valve, an air starting valve and two scavenging air valves. High pressure air and fuel are admitted through the spray valve. The air starting valve is used only when starting or reversing by air. Low pressure air from the scavenging receiver is admitted through the scavenging air valves, to remove the products of combustion. All valves are driven by a camshaft carried in bearings on top of the cylinder heads. This shaft is driven from the crankshaft through a vertical shaft and spiral gears.

The working pistons are stepped, the upper part forming the working piston and the lower the scavenging piston. The wrist pins, which are of large size, are located in the scavenger piston, where the temperatures are low. The scavenger cylinder acts as a crosshead guide and is water-cooled. The working and air compressor cylinders and heads are also water-cooled. Fresh water from a separate system is used to cool the pistons in place of oil. The lubrication is of the pressure type, lubricating oil being supplied by a small pump.

There are two independent sets of pumps, each consisting of a centrifugal salt water pump, a rotary fresh water pump, a rotary lubricating oil pump and a rotary fuel oil pump. Each unit is driven by a separate motor and is sufficient for the needs of the engine at full power.

Fuel is supplied to the engine as follows: The fuel pump takes suction from the fuel storage tanks and delivers to a gravity tank in the engine hatch. From the gravity tank oil flows to the fuel measuring pumps on the engine, which deliver oil to the cylinders in the quantity required for any given power. A governor controls the quantity of oil discharged by the pumps and prevents racing.



The "Fulton's" 1000 horse power Nlseco Diesel. Fuel cost $1.18 per hour at 11.9 knots.

On account of the peculiar requirements of the service for which the "Fulton" was designed, the outfit of auxiliaries is rather more extensive than is customary. The anchor windlass, steering engine and towing machine are of the usual steam-driven types, while the electrical equipment consists of two independent installations—a turbo-generator for lighting the ship and furnishing power for auxiliary motors and two large generators coupled to the main engine, primarily intended for charging the batteries of submarines. The two latter are

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located on the same fore and aft line as the main engine and immediately forward of it.

The following is a brief record of the "Fulton's" trials: On October 31st the vessel was standardized on the Provincetown course to determine the speed corresponding to the number of revolutions made by the engine. Five different speeds were used in this standardization, the highest speed on the average of five runs being 12.78 knots, corresponding to 259.4 R.P.M., or a half knot in excess of her guaranteed speed of 12.25 knots. These trials were followed by anchor tests and maneuvering trials. With the ship running full speed ahead, the signal was sent to the engine room to reverse. The time required to reverse the engine was twelve seconds. The time required to bring the ship to a dead stop in the water was forty-five seconds. Other maneuvering trials, such as the determination of turning circle, maneuvering of helm under various conditions, etc., were also carried out, with most satisfactory results.

A four-hour test at a cruising speed of 11.9 knots followed, the object of this test being to determine the amount of fuel used by both the main engine and auxiliary boiler. The test showed the consumption of the engine to be 47.3 gals. per hour, while that of the boiler was 37.8 gals.

On November 1st the eight-hour full power test was made, with an average speed for the eight hours of 12.35 knots and an average of 249.49 R.P.M. The average fuel consumption for the main engine was 66.72 gallons per hour, or a fuel cost, based on the price of fuel oil on the Pacific Coast, of $1.58 per hour.

During all of the above tests the performance of the engine was perfect. At no time was the engine shut down nor was there the slightest evidence of undue heating, unusual noise, or other derangement.

From the fuel consumptions given it will be seen that the "Fulton" could travel, on a given amount of oil, four to five times the distance possible to a similar vessel equipped with steam engines. With the amount of fuel carried it would be possible for her to cruise a total distance of 10,000 miles before refilling her tanks. When to the great saving in fuel cost is added the saving in the number of men required to operate the machinery, the enormous commercial advantages due to the use of heavy oil engines at once become apparent.

THE HARBOR OF HAMBURG.

Some conception of the extent of the harbor of Hamburg, Germany, may be obtained from the fact that it provides more than 130,000 linear feet of dockage, with about 5,000,000 square feet of space for unloading. These docks are, however, used for package freight only, the bulk cargoes being unloaded at other quays directly into cars for transport to destination, or into elevators and storage warehouses, or into lighters for transportation by water route to inland factories. Two years ago an extension of these already large harbor facilities was decided upon and an expenditure authorized to cover another 40,000 linear feet of quay. In 1912 there were unloaded in Hamburg Harbor 18,400 vessels with an aggregate tonnage of 14,000,000.

There are now in use about 650 ship cranes of three tons capacity, some of which are steam operated, while others are operated by electric power furnished by the municipally-owned power station. The steam-operated cranes are self-contained, each crane having its own boiler. Besides these there are upward of 100 traveling electrically operated cranes. They are constructed with one leg resting on a tee rail at the water edge of the quay while the other end is directly supported on a rail mounted upon the wall of the dock shed. Electric power is used for hoisting and for transverse movement of the trolley only, the movement along the dock being effected by hand-operated gear and rack. The distribution of these cranes is 1 to each 65 feet of quay. The crane equipment is so arranged that two or three cranes may be brought into use at one hatch at the same time, thus greatly facilitating the unloading.

The quay sheds are 200 feet wide and connected by tracks with the network of railways extending to every part of the continent. They are built of wood, and the argument used by the speaker in referring to the fact was that if a fire occurred the sheds were always destroyed anyway, and if they were of wood the fire made a good clean job; if steel is used there is left a mass of distorted structural steel that is very difficult to clear away.

At some parts of the quay there are "double cranes," as the Germans call them, a revolving crane at the top and a bridge crane at the bottom, having its traveler of the usual construction. The lower, or bridge, crane is of the cantilever type, one end extending out over the water and so constructed as to permit the trolley to pass between the legs of the bridge. The overhanging portion is arranged to be drawn in when not in use, thus avoiding any obstruction to the traffic along the quay wall.

Quite recently about 300 members of the American Society of Mechanical Engineers arrived in Hamburg, and while there they were shown through the shipyards of Blohm & Voss. A number of cruisers and other war craft were seen in various stages of construction, and the largest vessel afloat, the "Vaterland," was having the finishing touches put upon her enormous hull.

Probably the most interesting feature of the yard equipment is the 250-ton "Hammer type" crane erected at the edge of the wharf and used for placing the power equipment and other heavy parts aboard ship. It rises into the air about 300 feet and is a remarkable piece of engineering work. It is operated throughout by electricity. One arm reaches out a distance of 164 feet and at this radius will lift 100 tons, while at 105 feet 250 tons can be raised and lowered into the ship's hold. There are several other very large cranes, some of which are mounted on floating docks.

Originally the River Elbe had a depth of 15 feet at high water, but continuous dredging has resulted in a 37-foot channel clear to the open sea, some 50 miles distant; this depth is to be increased to 40 feet. Twelve dredges are constantly at work upon this improvement.

A tunnel has been driven under the Elbe that enables pedestrians and teams to pass uninterruptedly. There are two tubes of wrought metal 20 feet in diameter that terminate on either side of the river at elevator shafts, there being no inclined roadway, as is the case with most river tunnels. At busy rush hours in the morning and evening all team traffic is stopped and foot passengers only are allowed the use of the tunnel. Otis elevators are used for both foot and team traffic entering or leaving the tunnel.

Redwood City is agitating strongly at the present time for a deeper channel to San Francisco Bay. The project outlined consists in the straightening out of the very crooked slough now used by bay schooners. An effort will be made to secure a Government appropriation to cover a part of the work.

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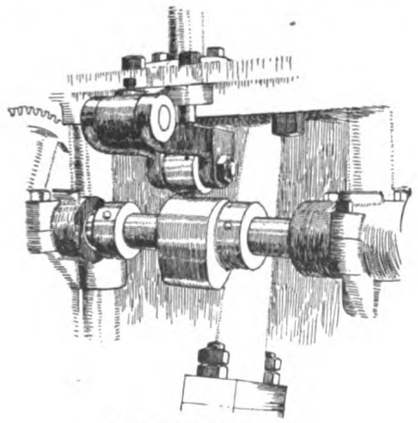
The Steel Train Ferry "Ramon"

IN THESE days of large Diesel engines it is noteworthy that an internal combustion engine of the electric ignition type should be built in a size approaching that of the propelling machinery of the large motor ships that are now so well known throughout the world. Such an engine has just been completed at the works of the Union Gas Engine Company, at East Oakland, and after a highly satisfactory performance is now being installed in a double-ended ferry boat built by the Oakland, Antioch & Eastern Railway.

This vessel, which is constructed of steel throughout, is to be used for transferring electric trains across the Sacramento River from Mallard Island to Chipps Island, and will be equipped with three tracks, each 220 feet long. She is 236 feet overall, with 58-foot beam and a maximum draft of 12 feet.

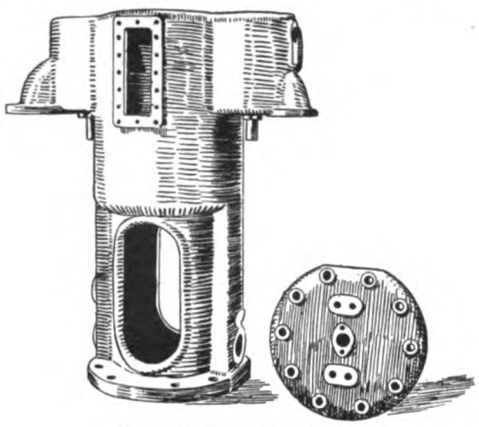
The arrangements for the propulsion of the "Ramon" are rather unusual for a motor-driven craft, although the same scheme has been used for steam vessels of similar character. The engine, which is a 600 H. P. unit, is set amidships, and is coupled to a propeller at each end, through friction clutches. As the two propellers are of the opposite pitch, the direction of the boat is controlled by engaging either one clutch or the other, thus eliminating all necessity for reverse gears, or making the motor direct reversible.

This installation possesses unusual interest from the fact that the propelling machinery consists of the largest distillate or gasoline engine ever constructed. This unit is an eight cylinder "Union" open crosshead engine of 600 H. P., operating at a normal speed of 210 R. P. M. The weight of the engine alone is approximately 90,000 pounds, and it measures 45 feet in length over thrust blocks. As will be noted from the illustration of one of the cylinders, the latter are cast separately, and are of the open crosshead type, the lower part being cut away to form guides. These openings give access to the upper connecting rod brass, and also allow a positive oil feed to be fitted to the piston pin, which feed is in connection with a force feed oiling system. The piston is exceptionally long, and has openings in the side to correspond with those in the cylinder. The piston pin is placed below these openings, and the circulation of air induced by the pumping action of the piston has a decided cooling effect on the upper connecting rod brasses, and on the upper end of the piston itself. It is well known that with internal combustion engines of large cylinder dimensions one of the principal difficulties to be overcome is the proper cooling of the piston. The makers in this case seem to have effectually solved the problem by the open crosshead design, whereby the piston and pin are cooled without the complications consequent to the circulation of water through the moving member. The cylinders are of the T-head type, with valves on opposite sides operated by plungers and tappets off separate camshafts. Notwithstanding the high power of this engine, the whole construction is very simple, and is merely an enlargement of one of the smaller sizes.



Valve Lifter Lever.

Starting is accomplished by means of compressed air which is delivered to four cylinders through a distributing valve. There is also a compression releasing gear fitted to the exhaust valves for use in case the engine is "barred" over. Lubrication is effected by four mechanical force-fed oilers positively driven from the camshaft. From these lubricators separate oil pipes lead to all the principal working parts, the pumps being capable of delivering oil against a pressure of 80 lbs. The crankpin bearings are lubricated by means of a centrifugal oil ring fastened to the crank web and connecting with oil holes leading out to the center of the crankpin. The inlet and exhaust valve mechanism is so arranged that the side thrust of each cam is taken up by a valve lifter lever and roller of special design. The exhaust valves are water-cooled.



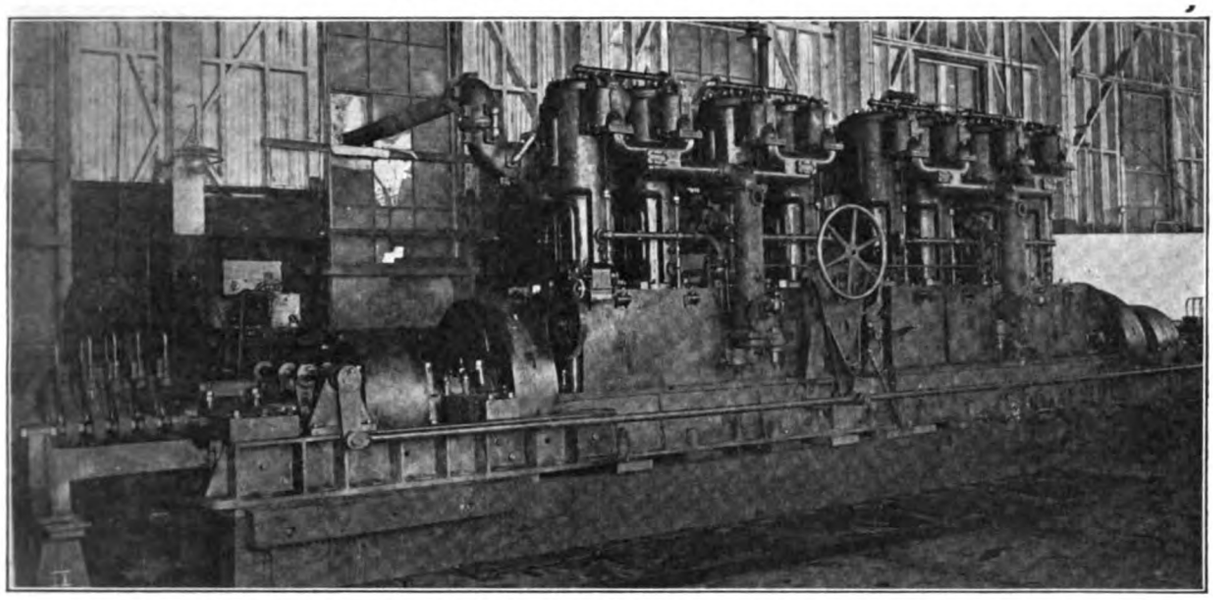
Open Crosshead Cylinder.

In addition to the main engine, an auxiliary engine of 20 H. P. is located on an intermediate deck at one end of the engine-room. This engine is coupled to a generator for supplying current to the ship's lights and for lighting the cars in transit. It is also arranged to drive an air compressor and bilge pump.

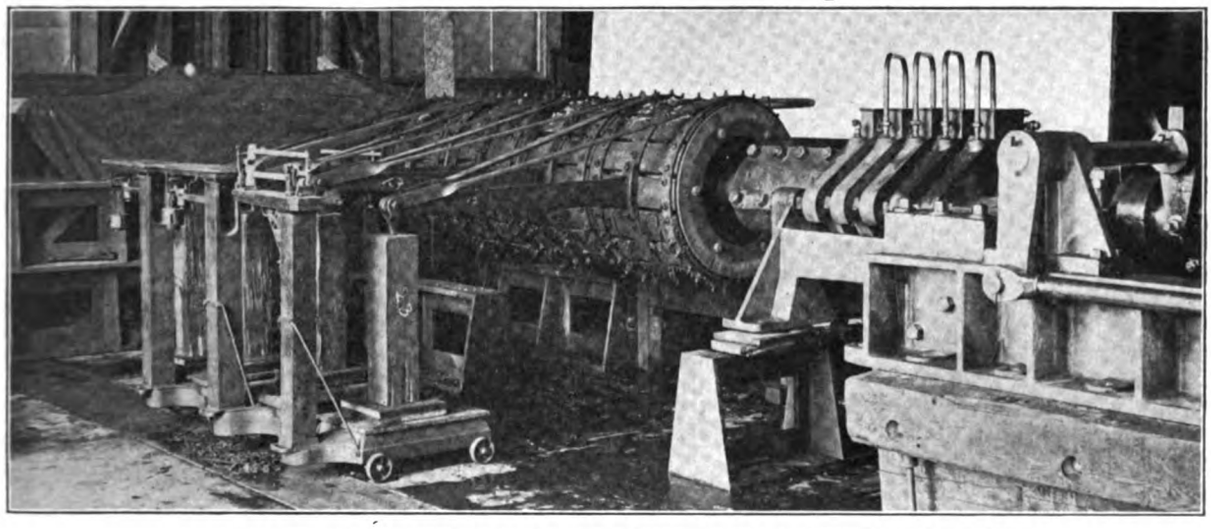
The "Ramon" is well provided against end or side collision, for there are two longitudinal bulkheads extending the entire length of the vessel, and four transverse bulkheads across the full width; thus dividing the hull into eleven watertight compartments. The engine-room, which, as stated above, is located in the center of the boat, is seventy feet long by thirteen feet wide by sixteen feet deep. A lunch room is provided below decks for the accommodation of passengers, thus keeping the main deck clear with the exception of a small house on either side containing toilets, lamp room and lockers. The pilot house is located on a steel bridge supported amidships over the tracks.

The saving effected by the use of distillate engines in this type of boat will be readily appreciated when it is

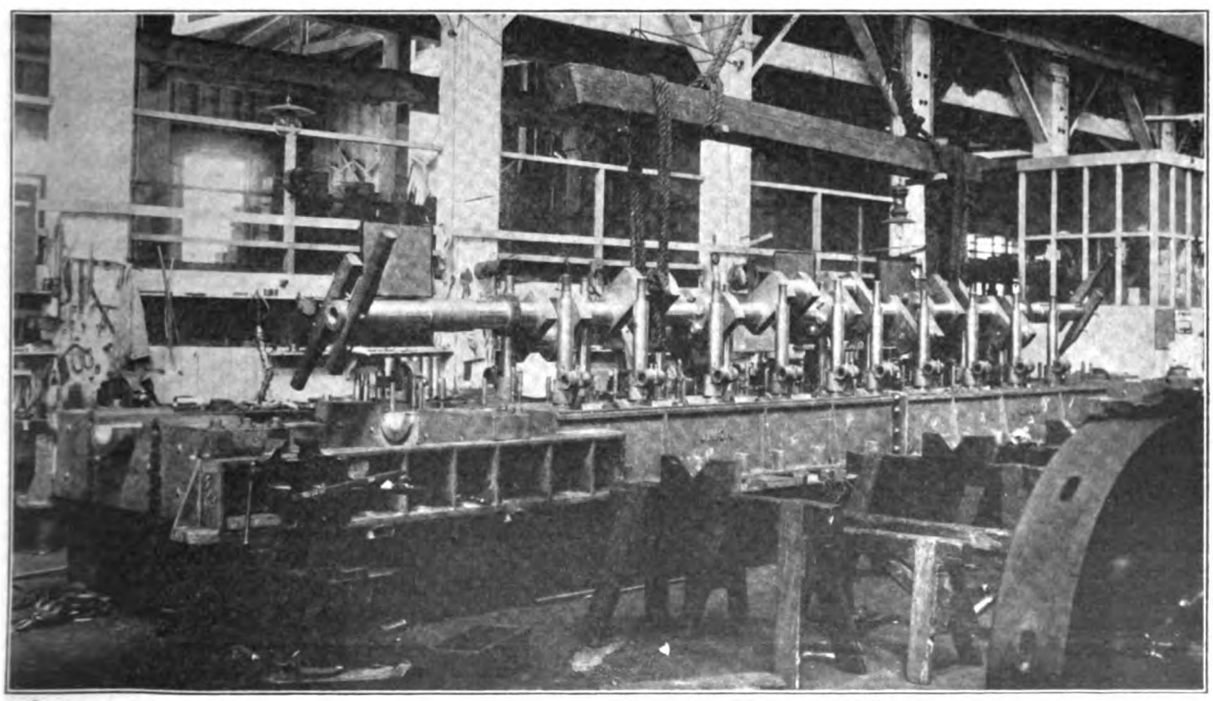
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View of the "Ramon's" engine on the testing block of the Union Gas Engine Company's plant.



The arrangement of the brake mechanism used in measuring the shaft horse power.



Lowering the crank shaft into place.

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considered that the engine-room force will consist of one engineer only, this being a considerable reduction in the number of men that would be required for a steam installation of equal capacity. The greatest saving, however, is the elimination of all fuel expense while the vessel is tied up in the slip between runs, and this was one of the principal reasons for installing distillate engines, instead of steam.

SPROULE ON CANAL.

President William Sproule recently gave out the following interesting and instructive interview in relation to the rapid growth of freightage through the canal and its probable effect on the transcontinental railroads, his remarks being particularly applicable to California and the Southern Pacific Railway:

"The opening of the Panama Canal, in commemoration of which two expositions are to be held, has aroused enthusiasm in California and other Pacific Coast States. The commerce of the Pacific Coast is in the throes of a transportation transition. Shipments by sea between the Atlantic and Pacific ports have doubled since the canal was opened, and this fact is sometimes accepted as indicating a correspondingly greater aggregate of business.

"The interesting feature, however, is that this greater water traffic, far from indicating a tremendous trade advance, has resulted partly from better crops and partly from a diversion of traffic from transcontinental railroads to the canal.

"The tonnage from California to the Atlantic seaboard, by sea and rail combined, in August, September and October of 1913, totaled 120,000. Of this the railroads got 67,000 tons, or 56 per cent., and the sea carriers got 53,000, or 44 per cent. For the same period in 1914, the total tonnage was 170,000. Of this the railroads got 67,000, or 39 per cent., and the sea carriers got 103,000, or 61 per cent.

"Thus, the sea carriers' takings of the total tonnage from California for these three months increased 17 per cent., while the tonnage by rail remained stationary.

"California, with a thousand miles of coastline, is peculiar in having but three main ports for large ocean steamers, so that the tendency of the canal is to make these three harbors the funnels through which shipments pour into and out of the interior of the State. These three are San Francisco, San Pedro (the harbor of Los Angeles), and San Diego.

"It is true that water traffic through these ports has greatly increased with the completion of the Panama waterway, but this condition is due chiefly to a reallotment of shipments between sea and rail carriers, the sea gaining at the expense of the rail.

"The question is asked as to what effect this diversion will have on the labor and industries of the Pacific Coast and on the rail carriers.

"The Southern Pacific is California's largest institution. It has more than half the railway mileage of the State. It reaches practically every community. It is the most extensive employer of labor and the greatest spender in the State. It was the first transcontinental railroad. It was the only one built from California to the East. It has done more for California's development than any other single factor.

"The Southern Pacific contributes to the welfare of California by paying $9,000 a day taxes, that is to say, $3,264,000 a year. The Southern Pacific spends yearly in California about $6,000,000 in material and supplies, patronizing home industry whenever possible. Its yearly payroll in California, on which there are 30,000 men, totals $29,000,000, not including salaries of its executive officers.

"Let us look at it in another way. Out of every dollar that the railroads of the United States take in, they spend 44.05 cents for labor in wages; 8.64 cents for fuel and oil; 14.46 cents for material and supplies; 2.26 cents in losses and damage to freight and injuries to persons, including employees; 3.92 cents for leases of roads; 4.14 cents for taxes; 4.57 cents for improvements; 13.04 cents for interest.

"The remark has been made that a dollar's business diverted from the railroad means that the railroad has suffered the loss of a dollar. But, directly, the railroads have lost only the profit on the transaction, which is 4.92 cents. Local labor has lost 44.05 cents; the merchants and manufacturers furnishing supplies have lost 14.46 cents—and through this loss to them labor again loses—and other beneficiaries of the railroad dollar have been cut off from what would have been their share. Indirectly, the railroad's loss is serious, because so many of its expenditures do not vary with the volume of business handled, and so its average expense increases as its business declines.

"It is too early to tell what will be the effect on California of the Panama Canal. So far, it has affected only the current of traffic, rail compared with sea, at a greatly reduced sea rate. It has created no new traffic. The character of the business moving to-day is the same as in the past. The canal may, for California, stimulate new production and increase production, but as this will make competition greater between the producers, it is not likely that the Pacific Coast producer and distributor can retain any part of whatever reduction in cost of transportation the canal may achieve. The Eastern buyer will absorb the reduction in cost of carriage. It is not likely that new manufactures will be stimulated because of our higher wage scale and higher standard of individual living. On the contrary, this market is likely to be crowded with the productions of Eastern manufacturers because of low cost of water transportation.

"With respect to our foreign trade, the effect of the canal can not be determined until the European war ends."

BOOK REVIEWS.

The Naval Constructor, by George Simpson, M. I. N. A., third edition, revised and enlarged. The D. Van Nostrand Company, New York, publishers. Price, $5.00 net.

The revision of Simpson's Naval Constructor for the third edition practically amounts to the publication of a new book, as the matter has been completely revised, rearranged and brought up-to-date. This volume should prove of great value to engineers and naval architects, as its treatment of ship designing and construction is not one bit more thorough than the exhaustive chapters on a vessel's outfit. An interesting section is that on specification forms in which a complete arrangement of heads and subheads for a model specification is given. The text is well illustrated by diagrams and the indexing of the contents is well arranged and handy.

The Keesling ways and shipbuilding plant of Anacortes, Washington, is quite busy with an unusual amount of small work, there being enough fishing launches, schooners and scows to insure a full season's work.

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Pacific Coast Shipping Notes

SAN FRANCISCO.

The steamer "Baja-California," which is to inaugurate a new Mexican service, arrived during the early part of the month. She is a 2500-ton dead weight freighter and is 265' 0" between perpendiculars, 38' 6" beam and 20' 3" molded depth. She was built under the special survey of the Norske Veritas and to Norwegian Board of Trade requirements. The new vessel is an oil burner. C. Henry Smith, Inc., is the San Francisco representative of the new line.

Word has been received from Sweden to the effect that the new motor ship "Pacific" will take the place of the "Kronprincessan Margareta" in the Johnson line service to this port. The "Pacific" left Stockholm a few days ago. W. R. Grace & Company are the local agents of the Johnson line.

When the barkentine "E. R. Sterling" came into the bay a few days ago she was probably under the command of the youngest captain on the Pacific, Roy M. Sterling, who is only 21 years old.

The Farmers' Transportation Company's new steamer "Sacramento" started on her maiden trip from San Francisco to Colusa on December 8th. The "Sacramento" represents the very latest ideas in river steamboating and should prove a great success.

Moore & Scott have just finished extensive alterations and repairs on the steamer "Manila," which will sail shortly under the house flag of the Agencias De Berna, the well known Peruvian firm of steamship owners. The "Manila" will inaugurate a new service between San Francisco and Balboa and Columbian and Ecuadorean ports.

The steamer "Roanoke" was the first vessel to formally dock at Santa Cruz's new municipal pier. The passengers and crew of the "Roanoke" were the special guests of Santa Cruz during the celebration.

The old steamer "Kansas City" is to be completely overhauled at the Union Iron Works and have a double bottom installed. The repairs and replacements contemplated practically mean a new hull.

The Great Northern Pacific Company has made formal application to the State Board of Harbor Commissioners for the use of Pier 9, now occupied by the Pacific Coast Steamship Company. It is understood that the "Great Northern" and the "Northern Pacific" will use Pier 9 upon their arrival provided the new piers south of the ferry are far enough advanced to permit of the Pacfic Coast Steamship Company being accommodated there.

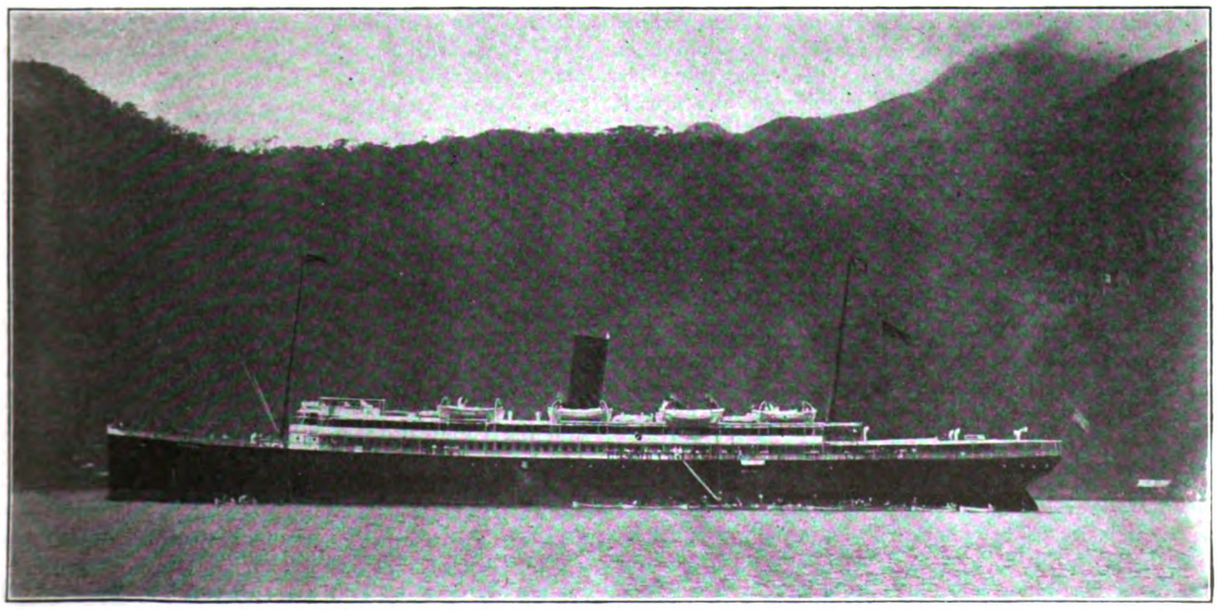
The exhibit of the United States Lighthouse Service at the Panama-Pacific Exposition has been alloted a space approximately 40 by 63 feet in the north end of the machinery building. About 75 per cent. of the exhibit has already been shipped.

PORTLAND.

New dolphins have been placed at the new moorings of the Diamond O fleet adjoining the yards of the Portland Shipbuilding Company.

Henry L. Beck, Inspector of the Seventeenth Lighthouse District, recently returned to Portland after an inspection tour on the lighthouse tender "Heather."

The Willamette Iron & Steel Works secured the general contract for the repair work on the "Santa Catalina," badly damaged by fire on October 18th. This



The Oceanic Steamship Company's S. S. "Ventura" at Papeete.

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repair job will run close to $300,000 before it is completed and the Portland water front community is jubilant over landing the work. It is understood that the Willamette Iron & Steel Works made such a splendid start at stripping the "Santa Catalina" that a lot of the material for the job, which was to have to come from the Cramp's shipyard on the Grace steamer "Santa Clara," had to be sent by rail in order not to delay the work.

The steamer "Daisy Freeman," which grounded on Clatsop Spit on November 18th was repaired at the St. Helens shipyard. The rudder, rudder post and about seventy feet of the keel were renewed at a cost of about $4,000. The St. Helens Shipbuilding Company now have under construction the hull of the Government dredge "Monticello," the machinery for which is being turned out by the Willamette Iron & Steel Works. The McCormick steamer just launched at St. Helens was christened the "Cascade" and will shortly be towed to San Francisco where her machinery will be installed.

There is an agitation under way to secure a motor-boat canal from seaside to Warrenton. The project is a very simple one from an engineering standpoint, in fact, this route has sometimes been suggested as feasible for a ship canal which would do away with negotiating the Columbia River bar. The ship scheme would necessitate the construction of a small refuge harbor under Tillamook Head, but this too could be accomplished at comparatively small expense.



Seattle's busy and interesting waterfront.

SEATTLE.

The Anderson Steamship Company are constructing a new lighthouse tender for the Government Lighthouse Service. The little craft will be of steel 125' 0" long, 26' 0" beam and 7' 0" draft and will be used primarily for inshore work where a light draft of water is essential. A similar boat is being built by the Hall Brothers of Winslow, Washington.

Libby, McNeil & Libby have contracted for a 110-foot wooden steamer to act as tender in connection with the Alaska canneries. The vessel will represent an expenditure of about $75,000.

The Seattle Ship & Engine Building Company has recently been incorporated and it is understood that this means ultimately another large shipbuilding plant for Seattle. The new yards will be established on the present site of the Anderson Steamboat Company's yard near Kirkland. A temporary plant on leased ground on the East Waterway is being now used for construction of the Government lighthouse tender "Rose." The construction of the new King County ferry "Lincoln" will be carried on at the Anderson Steamboat Company's yard. It is understood that Captain John L. Anderson is the moving spirit in the new shipbuilding plant and that as soon as suitable shops are built and sufficient machinery assembled that the new concern will attempt to land some submarine contracts.

Captain Omar J. Humphrey and associates have started the construction of a three-masted power schooner 140 feet in length which they expect to have ready for the Kuskokwim river trade by the middle of May next.

Seattle has secured a new connection with Mexican West Coast ports through the service of Swayne and Hoyt. The steamer "Navajo" has been put on this service and will be backed up with more vessels as the trade expands.

On November 12th a number of shipmasters of the Puget Sound district held a meeting at Seattle and formed the Shipmasters' Benevolent Association of the Pacific Coast. The object of the new institution is to advance the interests of the shipmasters, to improve their conditions in courts of inquiry, marine and customs procedure, amending oppressive shipping laws, seeking representation at Washington, recommending aids to navigation, assisting members out of employment and contributing towards the relief of those who are sick or in distress and to widows left destitute.

The headquarters of the Association will be at Seattle and the cooperation of masters up and down the entire coast will be sought. At the opening meeting about one hundred charter members were secured. Captain Frank White was elected temporary chairman, and he appointed Captains John A. O'Brien, Fred Warner, M. M. Jensen, G. W. Morgan, Fred Harriman and R. C. McGillivray as a committee to draft up a set of rules, by-laws and regulations.

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European Marine Notes

Shipping Position and the War.

IN DEALING with the marine matters from London one cannot get away from the war. One thing can be said that despite the continuance and the intensification of hostilities, general conditions in the United Kingdom have improved, unemployment is decreasing, and in particular some industries are booming. These, of course, are those having large orders placed by the military authorities of Great Britain, France and Russia. So far as shipping is concerned, your correspondent, perhaps, could not do better than quote the opinion given him by Shaw, Savill & Albion, representative shipping owners on this side. This firm says:

"We do not anticipate that the present national and political situation will affect the interests of the shareholders in this company. Our authorities have made such excellent arrangements for the protection of British commerce that we are able to continue our business with a minimum of interruption."

With regard to the general disturbances to shipping from the exploits of German commercial raiders, a good deal of news comes to hand from time to time, but it is certainly allowable to ask whether Great Britain has had cause for uneasiness and whether she has suffered unduly, trading over the whole face of the globe as her ships do. Over 4,000 ships are registered in the United Kingdom as being engaged in foreign trade. The most conservative estimate—that reached by the Committee of Imperial Defense after consultation with leading shipping authorities—of the losses which we might expect to sustain in the first six months of war placed the figure at 10 per cent. Many persons, as the debates in the House of Commons revealed, held that this calculation was far too optimistic. Therefore, on the lowest basis we were led to anticipate that about 400 British vessels would be lost between August last and February, and half that number in three months. How, in fact, have we fared? Instead of 200 ships not more than 50 have been sunk, though the enemy has had on the trade routes a number of exceedingly swift cruisers, and these ships have been under the command of officers of great daring and resource. After practically three months of war only about 1 per cent of British ships have been sunk, instead of about 5 per cent. Of course, no one likes these incidents; though they are of no military importance, they are annoying. They have involved the destruction of a good deal of wealth; but have British food reserves or supplies of raw material been seriously affected? That is the test which we must apply. Everyone in Great Britain knows what the experience has been in our British homes, though Great Britain is at war with two powers possessing 1,150,000 tons of effective warship tonnage. On every $500 worth of goods the war risk is now assessed at $11 instead of $26.25, as it was originally, and the fund is solvent. A war charge of less than two cents in the dollar! The rates on hulls have also been considerably reduced. "Between 8,000 and 9,000 foreign voyages," I am reminded, "have been undertaken to and from United Kingdom ports, less than five per 1,000 of which have been interfered with, and of these losses a large number have been caused by merchant vessels taking everything for granted and proceeding without precautions, as if there was no war." On the other hand, German oversea trade has been ruined, her shipping has been captured or driven off the seas, her colonies have been seized—all by the influence of the British Navy and the naval forces associated with it. The experience of the war, indeed, justifies the challenging tone of the British Admiralty, confident in the intelligence and activity of its officers at sea, when it claims that "there is no occasion for anxiety and no excuse for complaint."

Shipping Surcharges.

The surcharges imposed by the English shipping companies at the commencement of the war in order to cover increased expenses, such as insurance and other matters, have in some cases been removed altogether of late, while in others they are being gradually reduced. Among the latter is the Union-Castle Mail Steamship Company, which now announces that the freight surcharge of 25 per cent. on the East African route has been reduced to 20 per cent. This decision will be received with satisfaction by the very large number of merchants and shippers concerned, and one may reasonably anticipate that it will not be long before a further concession is permissible.

Chairman of the Cunard Line Passes Away.

Mr. Alfred Booth, the well-known shipowner, died on Sunday at his Liverpool residence after a brief illness. Mr. Booth, who was a nephew of the Right Hon. Charles Booth, was born in 1872. Having graduated at Cambridge, he entered his father's office and eventually became a director of the Booth Steamship Company. Towards the close of 1901 he joined the Board of the Cunard Company, and after eight years was appointed first deputy-chairman, and then chairman and managing director. Besides his position on the boards of these two companies, he was chairman of the Anchor Line and a director of Thomas and John Brocklebank. He was on the committee of Lloyd's register, and was chairman of the Liverpool Dock Labor Joint Committee.

A New Shipping Line.

According to the "Gazette de Hollande," the Netherland Steamship Company, of Amsterdam, and the Rotterdam Lloyd, of Rotterdam, will combine shortly in opening a new fortnightly freight service between New

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York and Netherlands India. The first steamer to start will be the "Palembang" and the second the "Bawean."

British Shipowners and the Pacific.

All the schemes planned by the German steamship lines for the development of business in the Pacific, including sailings between New York and San Francisco through the Panama Canal, having been ended, British shipowners are now taking hold of the situation and will be well established in new trades by the time the war comes to an end. So far as concerns the southern part of the Pacific, the capture of the German colonies there is likely to lead to a big expansion of English and Australian shipping enterprise, as the sphere of activity is now much wider and promising. Hitherto the preferential treatment accorded to German steamers in what was known as the Bismarck Archipelago worked against other vessels and prevented developments. The position is now changed, and advantage will be taken of the altered conditions. Very soon, too, I believe, the former German possessions in the south seas will be linked by wireless with the Imperial and Australian systems, so that on the whole the trading outlook there is quite satisfactory.

The P. and O. British India Deal.

Notwithstanding the war, I understand that all arrangements have now been completed for the amalgamation between the Peninsular and Oriental and British India Steam Navigation Companies. They are, however, to be carried on as separate entities, although the offices of the latter were removed to those of the former in Leadenhall street to-day. The interests of the two will, in fact, be identical, and it is expected that considerable advantages will ensue to both lines and to the public from through booking arrangements and interchangeability of tickets, while economy in working will also be affected. Meanwhile, it is believed that the deal will have an important bearing upon the Indian mail question. Three alternative tenders for the renewal of the contract have been invited, one for an acceleration of the present service, the second for sailings twice a week from Bombay, and the third for the use of Karachi as a terminal port.

Launching Steamers in War Time.

The steel screw steamer "Valdes," built at Stockton-on-Tees for Robert MacAndrew and Co., of London, was launched satisfactorily on October 14th. The vessel is of the following dimensions, viz.: 277' x 40' x 26' 11" molded to shelter deck. She is built of steel to the highest class in Lloyd's Registry, under special survey. Water ballast is provided for in double bottom fore and aft and in peaks. She is equipped with patent steam windlass with quick warping ends, steam steering gear, six steam winches, electric light, winch condenser, telescopic masts, special derrick for lifting 25 tons, and all the latest improvements for rapid loading and discharging. The accommodation for Captain and officers is neatly fitted up in deckhouses amidships, the engineers being in deckhouse alongside engine casing, and the crew in the poop. The vessel has been specially built for the Spanish fruit trade, and is fitted with special ventilating arrangements. The cylinders are 21", 34", 56" x 39", with two large steel boilers working at 180 pounds pressure.

During the whole of the trial run everything worked with the greatest smoothness and a speed of 11 knots was maintained.

It is reported that the Government of the State of Victoria, Australia, is considering the subsidizing of a line either from Victoria or Puget Sound ports to Australian points.

THE NEW WELLAND CANAL.

The Welland Canal is the oldest and most important artificial waterway in Canada. It is located west of the Niagara river in the Province of Ontario, and follows a line from the village of Port Colborne, on Lake Erie, to Port Dalhousie, on Lake Ontario, a distance of 25 miles. The old canal has 25 locks each 270 feet in length, and with 14 feet of water on the sills.

The new canal, cosntruction on which is now under way, will be 200 feet wide on bottom and 310 feet at water line and the depth of water over lock sills will be 30 feet. There will be seven locks each 800 feet in length and each will have a lift of 46' 6", giving a total lift of 325' 6".

On the Panama and Sault Ste. Marie Canals the lock gates miter, but on the new Welland Canal the gates will be of the single leaf pattern, only one gate being required at each end of the lock. The lower gate will be 85 feet high, 90 feet long and ten feet thick. The gates will be of structural steel and will each weigh 1100 tons, as against the 750 tons of the Panama gates. The gates will not stand squarely across the channel but will slant to the opposite wall, the gate being three feet longer than the channel width.

The canal is to be finished in 1918 at a cost of $50,000,000, all of which is to be borne by the Dominion Government. The new waterway will be free to all vessels using it.

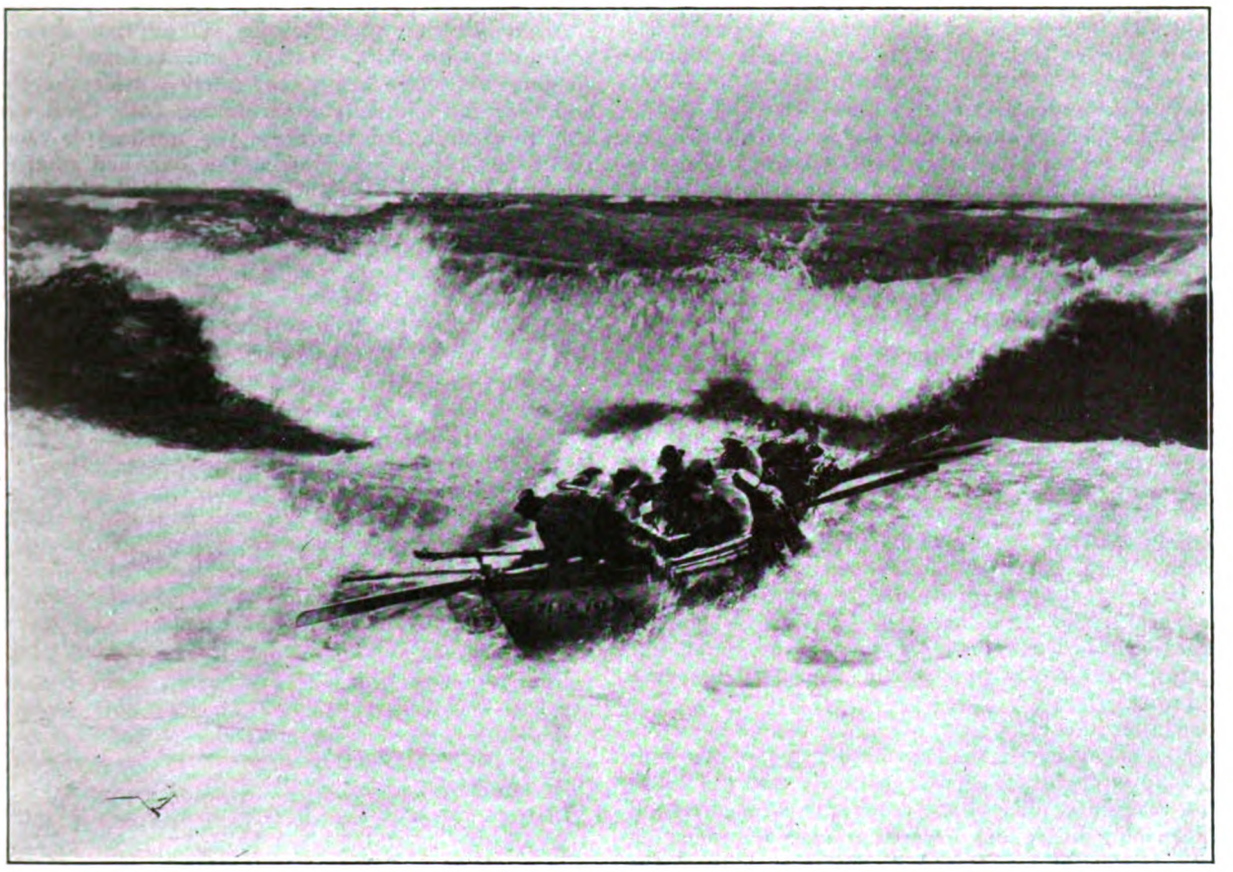
Among the new regulations promulgated by the United States Steamboat Inspection service is one to the effect that American vessels of 200 gross tons and over plying in the coastwise and offshore trades are required to be equipped with storm oil tanks fore and aft capable of containing prescribed quantities of oil in accordance with the vessel's tonnage, and pipes leading from such tanks to each side of the ship. Vessels of 150 gross tons or over must have lifeboats equipped with sea drags or sea anchors and oil bags. The regulations also require that the tail shafts of ocean steamers must be withdrawn for inspection at least once every two years.

Bids were received by the Navy Department on the 15th of the present month for a sea-going and fleet-keeping submarine. The new craft is very large, having a probable length of 300 feet, a cruising radius of 3500 miles and a surface speed of 21 knots. Diesel engines it is understood will furnish the motor power. The vessel will be armed with rapid fire guns and a large number of torpedos and the vessel will cost in the neighborhood of $1,250,000.

The Newport News Shipbuilding and Dry Dock Company recently undertook a novel job when they placed two steamers in the same dry dock to be lengthened. The two boats were the Ceiba and the Yoro, belonging to the Viccaro Brothers of New Orleans. Each vessel will be lengthened forty feet and the work will be completed early in January.

The Willamette Iron & Steel Works has secured the contract from the Government for constructing the dredge "Monticello" at a price of $27,830. This with the repairs on the Grace liner "Santa Catalina" and the overhauling of "Light Vessel No. 67," insures a busy winter for this concern.

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A life-saving crew in the surf.

Some Notable Shipwrecks on the Pacific Coast

By CHAS. A. HARBAUGH.

(Wreck photos by permission of Wedell Foss.)

WHEN Balboa first gazed upon the clear blue waters of the great western ocean and named it the Sea of Peace, little he knew of the sinister power lurking in its treacherous bosom, waiting to destroy the mariner who in the years to come should dare to traverse its illimitible wastes.

No statistics are available showing the value of the property endangered and lost and the number of lives sacrificed in shipwrecks along our Pacific seaboard since the tide of civilization first set toward the Golden West. It may be safely asserted, nevertheless, with respect to property losses, that the figures run far into the millions, and into the hundreds in the matter of loss of life.

Unlike our eastern shore line, the coasts of California, Oregon and Washington are for the most part precipitous and devoid of beaches. The principal points of danger to shipping are found at bay entrances and the mouths of several important rivers, namely: San Francisco Bay, Humboldt Bay, Coquille River, Coos Bay, Umpqua River, Yaquina Bay, Tillamook Bay, Nehalem River, Columbia River, Willapa Bay, and Grays Harbor.

At each of these places the outgoing current of bay or river, combined with the ceaseless action of tides and ocean currents, has built up extensive areas of sand shoals, over much of which the water is too shallow to be navigated by any but small craft. These shoals are constantly shifting, morever, so that charts of the localities do not always serve as an accurate guide to pilot or shipmaster.

Periodically the bodies of water named become flooded as a result of protracted rains, or exceptionally high tides due to storms or other atmospheric disturbances offshore.

An unusual rise in bay or river is always followed by an overwhelming rush of water seaward. This irresistible torrent, sweeping through the outlets, meets the ocean swells, which are much larger on the Pacific than on the Atlantic, and the clash of the two opposing forces creates a terrific and overwhelming surf, whose buffetings no vessel, however large or staunch, may long withstand.

Some idea of perils to be encountered at these danger points scattered along the coast from San Francisco to the Fuca Straits may be gained from a perusal of reports published annually by the United States Life-Saving Service, the operations of which establishment were extended to the Pacific Coast in the year 1878.

Nineteen of the 284 stations of the service that guard our ten thousand miles or so of coast are located upon the Pacific, the major portion of them at or near the entrances of the bays and rivers mentioned.

It appears from records kept at these stations that 1,808 accidents and disasters to vessels have been reported since the year above named, and that of the 12,000 persons whose lives were imperiled therein, 256

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were lost. The value of the property (vessels and cargoes) exposed to loss in these casualties is estimated to have been $28,000,000, of which amount $8,500,000 represents the value of property destroyed.

It should be remembered that the figures given relate only to those casualties that have occurred near the coast. Founderings, collisions and other disasters taking place away from the shore are beyond the jurisdiction of the life-saving corps.

Of the eighteen hundred and over disasters mentioned, several will go down in marine history as among the world's notable tragedies.

The "Atlantic."

Many of the older residents of California will doubtless recall, for instance, the loss of the whaling bark "Atlantic," which was wrecked December 7, 1886, off the entrance to San Francisco Harbor with the loss of twenty-seven of her crew of thirty-eight men.

After leaving the harbor the "Atlantic" was becalmed in the locality of the bar and a heavy ground swell bore her helplessly into broken water near Golden Gate Park. A thick fog prevailed at the time, and the waves broke high over her the moment she brought up hard and fast two hundred yards from the beach. Her crew made no distress signals. They did not even fire a gun.

Soon after the bark took bottom a sea swept seven of her company overboard, demolished two of her four boats, and wrought such havoc generally that she broke in two amidships. Six of the crew now manned one of the remaining boats and lowered it over the side, but a wave immediately swamped it, drowning four of the six. Two succeeded in reaching land after a hard struggle.

The master, mate and four sailors next essayed to get away in the one boat still on board, only to be overturned as the boat struck the water. Of the six, four swam to land. The others were drowned.

When the six men now on the beach had recovered somewhat from their exhaustion they found their way to the Golden Gate life-saving station, two miles to the northward. The life-saving crew made all possible haste to the scene of the wreck with their beach apparatus, and did everything that was humanly possible to effect the rescue of those still on board. They shot a line out through the fog, placing it fairly across the bark. While the sailors were engaged in hauling out the beach gear it was necessary to make secure on the wreck before the breeches buoy could be operated, the line in their hands fouled on some debris threshing about in the water alongside and broke. Before another line could be sent out a loud crash reached the ears of the beachmen, and the faintly discernible outlines of the vessel disappeared. She had gone to pieces. Five of the remnant of her crew that were precipitated into the sea when the end came were dragged out of the surf alive. The others—fourteen in number—perished.

The "Elizabeth."

Following the destruction of the "Atlantic" no disaster, made noteworthy by the sacrifice of life, took place upon the Pacific Coast within the scope of the life-saving establishment until February 21, 1891, when the ship "Elizabeth," of Belfast, Ireland, came to grief in the breakers some distance northward of Point Bonita, Cal., with the loss of eighteen of the twenty-nine persons she carried. The keeper of the life-saving station at Fort Point perished also upon the occasion of this wreck, having been washed out of his boat while fighting his way to the vessel with his crew.

A terrific gale was blowing at the time from the southeast, with thick weather, and a heavy sea was running. The "Elizabeth" got safely outside the Heads and over the bar, only to be forced back by a strong ebb tide on a lee shore to the northward. A tug spoke her before she crossed the bar, and offered to take her in tow for an anchorage inside the harbor, but the offer was refused owing to the inability of the tug and ship masters to agree upon a price for the service. The vessel went on the beach almost immediately afterwards. After she struck she took the tug's line, but it was then too late, for the tug had to cast off to avoid the misfortune that had befallen her.

As the destruction of the "Elizabeth" seemed inevitable her crew lost no time in getting into the boats. The second cutter was lowered first, with three men in it. In dropping astern the boat caught under the vessel's counter and capsized. Fortunately the occupants were picked up by the tug, which still stood by ready to afford any assistance within her power. A dinghy, launched a few moments later, with the mate, two sailors, and the captain's wife and two children on board, reached the tug without mishap.

After the second boat got away, the "Elizabeth" worked off the bottom and was floated again, but minus her keel and leaking badly. Two tugs now got a line to her and made a desperate effort to haul her out of danger, but soon had to cast off to save themselves from destruction.

Left to herself, the bark drove straight for the rocks, which soon held her beyond any possibility of escape. Within half an hour she hammered herself to pieces. Of the eighteen persons that were aboard her when she broke up, not one was saved.

The "Strathblane."

On November 3 of the same year that saw the loss of the "Elizabeth," the British steamer "Strathblane" went ashore on Ilwaco Beach, coast of Washington, several miles north of Cape Disappointment, Wash. She was entirely destroyed, and six of her crew of thirty-four persons perished. The only boat that got away from her and safely reached shore contained eight persons.

An hour or two after the stranding, a horseman brought news of the wreck to the Cape Disappointment life-saving station. The life-saving crew loaded their wreck gear into a boat and rowed two miles to a railway station. Men, boat and apparatus were then taken aboard a waiting flatcar and rushed overland the remaining distance to the vessel.

Six shots were fired with the little wreck gun in the course of the efforts that were made to put a line over the wreck, which lay six hundred yards off the beach. When all the line-carrying projectiles on hand had been expended the surfboat was taken from the car and launched.

A sixty-mile gale drove the sand along the beach in such clouds that the life-saving crew could scarcely face it. This, and the furious seas piling directly on shore furnished a situation calculated to test the skill and endurance of the boatmen. Twice they ran the nose of their craft into the water only to be thrown back on the beach before they could climb aboard. The third time they tried to launch they succeeded in getting to their oars and fairly started, but a huge comber picked them up while they were in the worst of the break, and, as if to show its contempt of their pigmy efforts to challenge the power of the sea, flung them helter-skelter on shore, badly

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injuring three oarsmen and practicaly wrecking the boat.

While these gallant but futile attempts to effect a rescue were being put forth the men on the "Strathblane" became convinced that no aid could reach them from the land. Their ship had broken in two and was fast going to pieces, and as their boats had already gone by the board their one remaining chance to save themselves seemed to lie in jumping into the sea and trying to swim ashore. They accordingly took this chance, going over the stern, where they had taken refuge.

Of the twenty-two men who sought thus to save themselves, sixteen were dragged out of the surf by



On shore, but safe until rough weather.

the life-savers. The six others perished while struggling to get free of the tangle of spars and rigging that threshed about under the ship's lee.

The "Argo."

On October 20, 1896, the steamer "Argo," bound from Empire City, Oregon, to San Francisco with seven passengers and a crew of twenty-five, was destroyed shortly after she emerged from Coos Bay into the ocean.

When the "Argo" neared the bar off the bay entrance she encountered a heavy northerly current, which swept her out of the channel. Although her helm was put hard astarboard and all steam crowded on, she continued to swing over until she struck a submerged rock near the jetty, tearing a great hole in her after compartment. She immediately began to fill and settle by the stern.

The water was so rough that the seas promptly swept her deck, carrying devastation and death before them. The after cabin, which sheltered five of the vessel's seven passengers, was torn loose and carried off with all its occupants.

Meanwhile the force of the current bore the steamer along until she fetched up two hundred yards north of the jetty, where she sank, leaving nothing visible above the water but her masts.

When the master realized that his vessel was doomed he ordered the boats cleared away. The end came so quickly, however, that there was only time to launch two of them. These got safely away with nine persons in each.

The master, who, with the eight others left behind, had climbed into the rigging, continued for a time to direct the men he had placed in charge of the boats. After they pulled away from the immediate vicinity of the wreck he shouted to them to stand by and try to save any of those in his party who might fall or be swept from their position.

On going aloft, two of the sailors took refuge in the starboard shrouds, but it seems that even there they were not beyond the reach of the waves, for shortly a sea, reaching upward like some monster ophidian striking for its prey, plucked the two men off and bore them away. Neither of the boats standing by was able to pick them up, and both were lost.

The mate, who was in command of one of the boats, handled his craft with admirable seamanship, but despite his skill his boat capsized about the time the two sailors were snatched from the rigging, and six of the occupants were drowned. Three were saved by the other boat. This one boat now had twelve persons on board. It continued to stand by, however, until the master, perceiving that for it to remain near the wreck longer would be to expose its load of people to needless peril, called to the occupants to pull for the land. The master's orders were obeyed, and the party happily made shore without accident.

It appears that the blasts of the "Argo's" whistle, when she found herself in trouble, were heard by a tug that had followed her down the bay to ascertain the condition of the bar. The tug quickly put back into the harbor and alarmed the Coos Bay life-saving crew.

The life-savers manned their boat and pulled to the government works at the shore-end of the jetty, but the weather was so thick that they were unable to see any distance offshore. Three of them, therefore, went out on the jetty on a handcar to try to ascertain her position and determine as to the best means of reaching her. When they came within three hundred yards of the end of the jetty they made out the rigging of the vessel rising above the water with several men in it, while standing by they saw a boat full of people.

When the men in the rigging saw the life-savers turn back they did not, of course, understand what they were about, and thought they were being left to their fate. Some time later, however, they were overjoyed to see a boat shoot from behind the jetty, "fairly flying," as the master afterwards expressed it, her crew stripped to the waist and pulling at their oars like demons.

It was out of the question for the life-saving crew to get close to the foremast, where the seven men were. They worked their way in near enough, however, for one of their number to hurl a line up into the hands of the sailors. By means of this line the imperiled seamen drew up a larger line from the boat, then, under instructions shouted from below, one of them fastened the rope about his body and jumped. When he had been hauled into the boat his shipmates drew the line back again and another man followed.

The above described performance was repeated until five men had been safely taken off, when it appeared

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that the tottering mast was about to fall. As there was no time to lose, the three men still to be rescued were ordered to "come all together."

The line was now fastened around the body of each man at intervals of a few feet along its length, and upon signal all three leaped out simultaneously. With the three men safe on board, the boat, now weighted down with sixteen persons, counting rescuers and rescued, turned about and put back to land.

The sinking of the steamer "City of Rio de Janeiro" on February 22, 1901, at the entrance to San Francisco Bay, claimed the lives of a greater number of people than perished in any marine casuality ever previously reported from the Pacific Coast. Practically nothing is known of the circumstances of this wreck.

It would seem from such information as is obtainable that while entering Golden Gate in a dense fog the vessel named was swept out of the channel by the tide and driven upon a rock, going down within a few miutes. Of the 209 souls composing her crew and passenger lists, 128 went down with her. Eighty-one persons succeeded in escaping in her boats and reaching the shore.

The exact spot where the steamer sunk has never been determined, although diligent search has been made for her upon a number of occasions, the quest being stimulated by the persistently circulated report that she carried several millions in treasure. This report was doubtless erroneous, as her cargo, according to official information furnished by her owners at the time of the disaster, consisted of silk, matting, tea and sugar. She was a vessel of nearly 4,000 tons, and was valued with her cargo at $900,000.

From the year 1901 to 1912, the reports of the Life-Saving Service chronicle no disaster in which the loss of life was so large as to entitle it to a place in the list of notable wrecks.

The "Rosecrans."

Then like a bolt from a clear sky, came the wrecking of the steamer "Rosecrans" off the Columbia River entrance on the morning of January 7, 1913, with the loss of thirty-three of her crew of thirty-six men.



German ship "Mimi," on shore near Nehalin, Oregon.

While this disaster was one of the most lamentable that has ever taken place within the limits of a life-saving station, it is gratifying to know that the work of the life-saving crews in attendance, although so meagre in results, furnishes as fine an example of heroism as has ever been credited to the corps. Rarely has a crew of the service had to contend against such overwhelming odds as did the two crews that endeavored to save the ship's company upon this occasion.

The "Rosecrans," a vessel of 3,000 tons, left Monterey, Cal., on the afternoon of January 4, 1913, with a cargo consisting of 19,000 barrels of crude oil, consigned to parties in Portland, Oregon. Her voyage up the coast was uneventful until the night of the 6th, when she found herself nearing the entrance to the Columbia River. On the evening of this date the wireless operator at Astoria received a message from her saying that she would be off the bar the following morning, it being the intention of her master to enter the river at daybreak of the 7th, when tidal conditions would favor the passage in.

It appears from the story of one of the quartermasters, John Slinning, that the steamer passed Tillamook light some time after 3 a. m. of the 7th. She was then a couple of miles off shore. A southerly gale was blowing at a sixty or seventy mile rate, and there was a heavy following sea. The weather was thick and it was raining in torrents, but light beacons were occasionally visible through the murk of the night.

About 4 o'clock a white light, taken to be the Cape Disappointment light, was seen well off the starboard bow. Still another light, thought to be North Head light, was visible half a point over the same bow. The Columbia River lightship, away off westward, could not be made out at all.

Having mistaken the shore lights, the steamer held to her course and ran past the river entrance, striking a few minutes after 5 o'clock on the dread shoal of Peacock Spit—that terror to sailors and fishermen which stretches out from the northerly cape like an arm of a giant squid ready to grasp and hold in a death embrace any ship sent by the fates into the surf that ever races madly to and fro over it.

Peacock Spit takes its name from the United States sloop-of-war "Peacock," which stranded upon the shoal in 1841. When a vessel grounds on this shallow she is either quickly pounded to pieces by the breakers or swallowed up in the yielding sands.

The surf in the locality, always heavy, was extremely so on the morning of the 7th. The "Rosecrans" struck at a point one and one-half miles from the shore and about the same distance west by south of the Cape Disappointment life-saving station.

Immediately after the stranding, orders were given the wireless operator on board to flash a S.O.S. call to the effect that the vessel was on the bar and breaking up. The message was repeated three or four times, after which the operator was instructed to shut off the current, the master being fearful that the sparks from the apparatus might set the cargo on fire.

The call for assistance was picked up by the operator at Astoria, who replied:

"O. K. Will send help! Where are you?"

From the "Rosecrans" came back:

"Water has washed into the cabin—I can't stay much longer—hel—"

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No signals other than the calls mentioned were made from the stranded vessel. The survivors could not say whether or not she had on board any rockets, blue lights, or other means of making known the fact that she was in trouble. Her whistle was not even blown, but doubtless for the very good reason that the engine room was flooded by the time the crew realized the seriousness of their situation.

The vessel had four lifeboats; but all of them were carried away soon after she struck. It is doubtful, however, whether they would have shaped differently the outcome of the morning's events had the crew been able to launch them, for no small craft could have survived the smother of seas breaking around the stricken craft.

As soon as possible the signal was given to reverse the engine and put the helm hard over. Orders were issued, also, to start the pumps with the object of emptying some of the cargo of oil and thus lighten the ship. But the mountainous seas, which beat furiously upon the steamer the moment her progress was interrupted, had already torn away her hatches and let in a deluge of water below deck, drowning her fires and extinguishing her lights.

After the engines stopped all hands gathered below amidship to wait for daylight, and help which they felt assured the wireless call would bring to them. Notwithstanding the wreck and ruin going on above deck, they remained below until nearly 9 a. m., by which time the body of the vessel had worked so far under water as to drive them to the open.

Stories of the Survivors.

All that is known of what transpired on board is contained in the stories of the three persons who survived the disaster. One of these was Quartermaster Peters. When Peters reached the deck he tried to get to the wheelhouse, where most of the crew had preceded him. While working his way forward he overtook the master bound for the same refuge, but having a hard time of it owing to a broken leg. Peters assisted the master, and the two reached the fiddley hatch under the overhang of the house. They were shortly compelled to seek safety elsewhere, however, for soon the after end of the house began to sag under the relentless hammering of boarding seas.

About this time Peters lost sight of the master, as a tremendous sea, separating them, swept the quartermaster athwart the deck and sent him hurly burly against the ship's rail. He would have gone overboard but for the circumstance that he managed to lay hold of something still fast to the body of the vessel. He enjoyed only a temporary respite, however. He now tried to make the rigging, but, chilled and exhausted as he was, he missed his footing and tumbled headlong to the deck. Before he could rise another sea raced down upon him and carried him off over the side.

But Dame Fortune was still with the quartermaster. As he bounced around in the icy smother alongside the vessel a plank, pushed seemingly by invisible hands, swept within his grasp. It proved to be his salvation. He held to it with a grip of desperation, the while it bore him away from the wreck and to the northward. Referring to his experience in the water, Peters says:

"I held to the plank for hours, it seemed, and finally drifted inshore near North Head light. I thought I was safe until I saw the rocks and breakers. I tried to swim clear of the rocks, and the current started to take me to sea again. Then I drifted northward once more and the breakers got me and took me ashore. I lost my plank in the broken water, and to make matters worse I was obliged to cut myself free of my life-preserver, which had worked up over my head. I stayed on top of the breakers as best I could, and was at last able to crawl up on some driftwood away from the sea."



The "Tanner" on a rocky beach.

The place where Peters made land was Tioga Beach, five miles up the coast from the scene of the disaster. A hunter found him as he lay helpless on the strand, and carried him up to a nearby house, where he was given first-aid treatment. Later, the keeper of the Klipson Beach life-saving station appeared and took him in charge.

Quartermaster Slinning was also below when the vessel struck. On gaining the deck he too climbed up on the bridge. Referring to what happened afterwards, he says:

"There were a number of men besides myself on the bridge. As the big seas lifted it and the pilot house off, I grabbed hold of the exhaust pipe and then worked my way around behind the smokestack. But a sea soon picked me up and carried me over the rail. Luckily, I managed to grasp the rail and hold on, and before long another sea threw me over toward the after rail, and I succeeded in getting up into the main rigging."

Slinning says he saw "quite a number washed overboard." Two others besides himself—carpenter Lundmark and a sailor named Cogna—also reached the mainmast and climbed up into the rigging. After they had remained aloft for several hours Slinning and Lundmark were rescued by the life-saving crew from Point Adams, as set forth further along in this narrative.

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Cogna, however, succumbed from exposure before the rescuers appeared on the scene.

Life-Savers Sight Wreck.

Up to 8:40 a. m.—three and a half hours after the "Rosecrans" went on the shoals—no one on shore had any definite information as to her position, the view offshore from the land still being obscured by an impenetrable fog. At the time mentioned a member of the crew of the Cape Disappointment life-saving station, on duty in the watch tower situated on the ocean side of the cape, discovered through a rift in the mist a steamer apparently at anchor in the breakers off McKenzie Head. He called Keeper Alfred Rimer from the main station building, a quarter of a mile distant, to take a look at the vessel. Her bow at that time was slightly down, but she displayed no distress signals.

One of the maxims of the Life-Saving Service is: "When in doubt go to sea." Keeper Rimer and his crew were accordingly soon on their way to the vessel in their powerboat "Tenacious." They tried first to go around the cape, but found it impossible to stem the furious gale and strong flooding tide. They therefore turned back and went through a cut-off at the south end of Sand Island, hoping thereby to get around Peacock Spit.

But mechanical power was finally compelled to yield to the overwhelming force of the elements, and they reluctantly turned back to await the ebbing of the tide.

Soon after their return to their station, Keeper Oscar S. Wicklund of the Point Adams life-saving station, on the south side of the river entrance, arrived with his crew in their powerboat "Dreadnaught," he having learned of the wreck indirectly through the wireless operator at Astoria.

The two service crews set out for the vessel shortly after noon, the Cape Disappointment boat proceeding about 200 yards ahead of the other. While the wind had moderated a little it was still blowing a gale, and the seas filled the two boats constantly as they sped oceanward.

When they arrived in the locality of the wreck, the "Tenacious" circled around her bow from the inshore side, then ran to a position southward of her. The Point Adams crew went in as close as they dared under her starboard quarter and shouted to the men in the rigging to jump, that being, in the opinion of Keeper Wicklund, the only way in which they could be saved, owing to the impossibility of getting in alongside the steamer or placing a line aboard her.

The first time they circled in and called to the sailors to take the plunge down into the roaring turmoil below, there was no response. Then the seas swept them away. They beat around a second time, but still the sailors clung stolidly to their swaying perch, giving no sign that they had heard the command coming up from below. A third, a fourth and a fifth time the



rescuers were swept away from the wreck, only to haul around and fight their way back. But still the men aloft refused to risk all to save themselves. As the boat neared the vessel the fifth time, a mountain of green water struck it square under the bow and tossed it end over end, washing five members of the crew out. In the overturn all except one man succeeded in holding on to the life rail. By the time the boat had righted itself the less fortunate surfman was three hundred yards away from it and apparently as good as lost; but his comrades who had succeeded in climbing back into the boat, set the engine going as quickly as they could, gave chase and almost by a miracle overtook him and pulled him on board.

The boat's crew were scarcely back in their places after the capsize occurred when the Cape Disappointment life-savers were observed signalling for help. Keeper Wicklund went to their assistance and found

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that they too had suffered an overturn, which, besides spilling them overboard, had seriously damaged their boat and put their engine out of commission.

A Disabled Surfboat.

It appears that while Keeper Rimer was on his way to the wreck his boat, the "Tenacious," sprang a leak and the engine became disabled. The boat could be kept under power, but its speed could not be regulated. Notwithstanding this handicap—a most serious one in a high sea—the boat's crew ran in near the wreck and tried to persuade the sailors to jump. As was the case with the Point Adams crew, they were unable to remain long in a position suitable for effecting a rescue. While waiting fifty yards away for a favorable chance to swing in under the "Rosecrans'" swaying mainmast, they were caught in a run of tremendously heavy seas. The keeper desperately maneuvered the boat to avoid disaster, but before the crew could resort to the oars in an effort to maintain steerage way the craft was thrown around broadside and upset. Notwithstanding the suddenness of the catastrophe all hands except the keeper and a surfman held on to the boat as it turned over and were still in their places when it righted itself. Keeper and surfman were borne rapidly away, but, regardless of the fact that the boat had its steering gear and rudder disabled, their comrades succeeded in picking them up.

With the keeper again in his place in the stern of the boat, the life-saving crew renewed their efforts to get back to the wreck, having recourse to their oars. But oars alone were unequal to the task, and, as they were in a "seething cauldron," to use the words of the keeper, the assistance of the "Dreadnaught" was importuned by wig-wag signal. The "Dreadnaught" went hurrying to their aid, as already stated, and hauled them into less turbulent water inshore, where they were taken in tow for the harbor by the tug "Fearless."

One would now have hazarded the prediction that the Cape Disappointment life-savers—their efforts to consummate a rescue abandoned, and the trip homeward begun under convoy of a powerful tug, had left all the perils of their enterprise behind. Such was not the case, however. That every one of them was not lost in the mishap soon to involve their boat was due entirely to the judgment and foresight of Capt. Parsons, master of the tug.

The "Fearless" had proceeded only a short distance toward the harbor, when Capt. Parsons became apprehensive that the boat towing along in his wake would not survive the passage over the bar. He therefore decided to remove the life-saving crew to his vessel. The wisdom of this decision, which was at once carried into effect, was soon apparent, for while the tug was still in the furious turmoil of waters on the bar the towing line snapped. The boat was no sooner adrift than a sea caught her up and rolled her over and over. The tug did not dare turn round and attempt to pick her up, and she was never seen again.

After conducting the "Tenacious" out of the surf-swept vicinity of the "Rosecrans," the "Dreadnaught" turned once again to her task of rescuing the three men in the ship's rigging.

By now the sailors aloft, having witnessed the desperate and seemingly hopeless fight waged by the two life-saving crews, began to realize that their own doom was certain, should their would-be rescuers fail of their purpose. Therefore, as the "Dreadnaught" approached them on this her sixth trip in near the wreck, Lundmark summoned his failing energies and leaped.



The end of the storm, the "Alice" looks like a ghost.

His benumbed figure came hurling down like a wounded bird and disappeared in the dirty hell-broth of boiling sea and petroleum, some of the vessel's oil tanks having burst about this time. It was afterwards learned that this liberated oil, streaking away to windward, a greasy ribbon of black, cut the edge off the ponderous seas and gave the sailors the courage to make the plunge.

As Lundmark rose to the surface several hundred feet away from the wreck the power boat darted after him like a cormorant after a fish and hauled him out of the water. The successful issue in his case gave Slinning the courage to follow suit, and he likewise was pulled out of the sea.

There was still another man in the rigging. But he was hanging to the ratlines and appeared to be dead. As the service boat hovered near, reluctant to seek safety in flight while there remained a possibility of saving the man, he fell. In the tumble his body struck an iron stanchion, then bounced overboard and the seas whirled it away along the writhing thread of petroleum. It was retrieved by the boatmen, but life was extinct.

It was now 4 o'clock, and darkness was coming in. The sea was still high, the wind blowing a gale and the tide running out like a mill-race. Keeper Wicklund knew that it would be suicidal to attempt to get into harbor in the weather that prevailed. He also grimly realized that no boat could live outside through the night. There remained therefore but one chance to preserve their lives—by going aboard the Columbia River lightship, anchored several miles westward, on the outer edge of the shoals. They accordingly headed straight for the open sea. Three hours later they hailed the light vessel, and received a hospitable welcome from her crew.

Instead of moderating, the gale became more violent as the night wore on, and by morning of the eighth the lightship itself was in danger of being dragged from its moorings. Some time during the day the "Dreadnaught," which had been left to ride astern of the lightship on fifty fathoms of line, went adrift, taking with it the body of the dead sailor. Neither body nor boat was ever afterwards seen.

On the 9th, the weather having improved, the tug "Oneonta" (Chas. B. Anderson, master) brought the life-saving crew and the two surviving sailors ashore from the light vessel.

Each member of the Life-Saving Service who performed duty upon the occasion of this wreck—sixteen

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persons in all—was the recipient of the gold medal bestowed by the United States government in recognition of heroic daring exhibited in saving or attempting to save life from the perils of the sea. Their services were, morever, still further publicly recognized in resolutions passed by the legislature of the State of Oregon.

For their share in the desperate enterprise undertaken by the life-saving corps the two tug masters, Captains Parsons and Anderson received, each, a strongly worded letter of commendation from Washington.

Captain Parsons, it will be recalled, was in the locality of the wreck when the two lifeboats were struggling so valiantly to reach the sailors still in her rigging. His presence on the scene was most providential. But for the opportune assistance given by him to the power-boat "Tenacious" after she became disabled, Keeper Rimer and his crew of surfmen might have perished, for it is altogether improbable that, crippled as they were, they could have made the refuge of the lightship.

THE OAKUM SITUATION.

By A. C. STRATFORD,

President the George Stratford Oakum Co.

The year 1914 has been a most unusual one in the Oakum business. To a greater extent than ever before in the memory of the present generation, has it been filled with anxieties, uncertainties and abnormal conditions. So many industries use the European situation as an excuse for raising prices when as a matter of fact they are not materially affected, that many who offer such reasons are looked upon with suspicion. The Oakum business, however, was one of the very first to feel the effect of the European war and this will be readily understood when it is explained how dependent this industry is upon the countries of Europe.

In the first place, all Oakum is made entirely of soft fibre. It contains no manila, sisal, isal, New Zealand, or any other fibres which are classed as hard, harsh, or wiry. This soft fibre, insofar as Marine Oakum is concerned, is made up almost entirely of the hemps and hemp tows, which are grown in Russia and Italy and the products made of such soft fibres such as old hemp ropes, like rigging, bolt rope and lanyards. Sometimes small quantities of soft fibre hemp which is grown in India are also used, but only certain qualities of this are capable of being utilized for this purpose. American grown hemp and flax, and Canadian flax are also used, but the nature of this hemp, as well as its color and the impossibility of cleaning the flax without too great a loss and expense almost eliminate these fibres as influencing factors in the manufacture of Oakum.

Thus it is seen that the American manufacturer is dependent upon importations of this new raw material from Russia, Italy and India. The hemps of these countries are used for making most of the cordage used in all of the European countries and when this cordage becomes too weak to stand the strain of its normal work, with a certain degree of safety, it becomes known as Oakum rope, and almost all of this kind of rope finds its way to this country. Most of the shipments of this material come from Germany, Belgium, France, Holland, England, Scotland, Norway, and Sweden.

As a natural sequence of war conditions in the countries where the largest supply is normally obtained all quantities, qualities and prices immediately became very uncertain and the manufacturers here felt the change at once, as the stocks on hand were low at all of the factories with hardly an exception. England had for a while, and Germany has now, an embargo against the exportation of this material while some shippers in Holland have lain down on their contracts until the end of the war. Meanwhile, ocean freight rates as well as insurance rates have increased several times.

Before the beginning of the war, this industry was affected like most all others by the radical and uncertain changes in our national legislation, particularly the tariff and by the Mexican situation, as considerable Oakum is exported to that country. Extreme depression, from above causes, was felt in the Oakum business as early in the year as February, and lasted until the end of July, during which time the average sales per month were about 26% in volume under the same months in 1913. This was a real depression. There was nothing theoretical or psycological about it.

There was great improvement in the demand from the last few days of July to the first week of September, making August the best month of the year. This demand, however, fell off so quickly that both September and October proved to be considerably under a fifteen years' average and November recorded itself as the poorest month in the whole year.

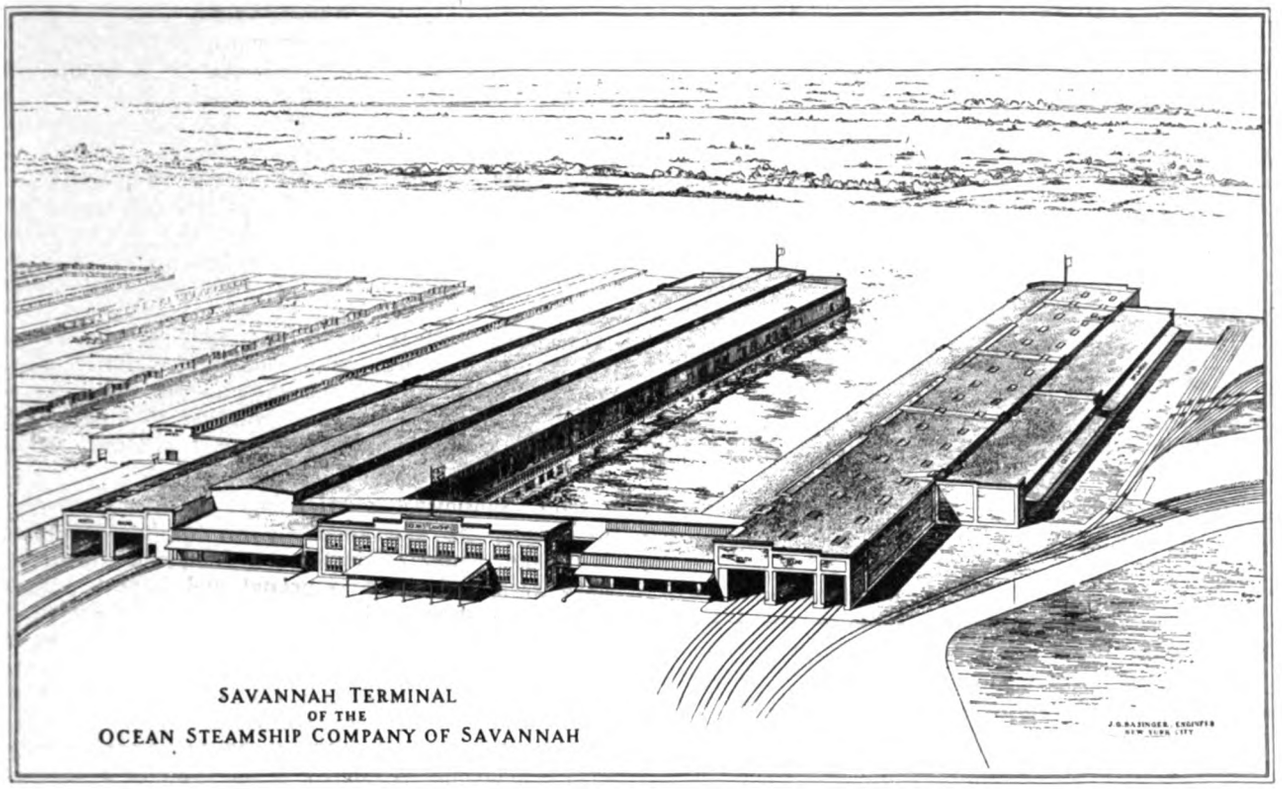
With variations, of course, but nevertheless with considerable certainty, the consumption of Oakum in this country is steadily declining and has been for many years. Thus as the consumption has decreased gradually have a number of the factories failed or voluntarily closed up as they found it impossible to secure enough business to make a living or have been unable to compete against their more up to date and more advantageously situated competitors, until only a few survive the many who formerly turned this product out. Even of these remaining, a few have found it necessary to spread out into kindred lines of manufacture and thus we find makers of Oakum are also makers of friction, trunk, and binders boards, jute packing, caulking cotton, sheathing felt, and even shredded bagging for upholstery purposes and still the Oakum production is at least equal to the demand, probably nine-tenths of the times.

Combined with this situation, the manufacturer here has always had to face the importation of Oakum from his foreign competitors who are still many. This Oakum has been brought into the country in large quantities at different times and places but never with any great degree of success, on account of its inferior quality. The chief efforts along this line were made in New York, Boston, Philadelphia, Baltimore, Cincinnati, Cleveland and New Orleans. One laughable attempt was made by a firm in St. Louis who claimed to manufacture the Oakum by a new and secret process and published a circular illustrating Noah building the Ark, with the caption "Noah used Oakum, but not (.....) because he couldn't get it."

The reasons for the failure of all these attempts to market foreign-made Oakum lie in both the different processes of manufacture here and abroad as well as in the different classes of raw material entering into the products. Foreign and domestic Oakums are so dissimilar in texture, finish, length of fibre, color, feeling, and odor, that most anyone who has handled Oakum at all can immediately tell the difference.

It is very difficult at this time to forecast the outlook for 1915. Much depends upon the raw material situation in Europe. Nothing can help the demand for Oakum more than good legislation allowing a ship subsidy along the lines on which the great English and German steamships are run.

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SAVANNAH TERMINAL
OF THE
OCEAN STEAMSHIP COMPANY OF SAVANNAH

A Splendid New Terminal

The Ocean Steamship Company of Savannah is planning a splendid new terminal at that city, the sketch reproduced above giving some idea of the extent of an undertaking that will mean much to the maritime development of Savannah and her tributary territory. The slip as shown in the sketch will be 225 feet wide by 1020 feet long and will have a depth of water alongside at mean low water of 26 feet. A reinforced concrete bulkhead will extend along the bank of the Savannah River and around three sides of the slip, giving a total length of quay wall of 2590 feet. The slip will afford berths for four steamers docking at the same time.

Along the sides and at the shore end of the slip, steel freight sheds and an office building will be erected covering an area of eleven and one-half acres. The north-bound freight shed will cover an area of 249,733 square feet; the south-bound freight shed an area of 166,898 square feet and the shed at the head of the slip an area of 30,910 square feet.

There will be seventeen railroad tracks under the shed having a total length of two miles and allowing of 225 freight cars being placed along side of the platform, all loading and discharging at the same time; that is one hundred cars discharging in north-bound shed and 125 cars loading in south-bound shed. Five ten-ton capacity traveling hoists (two being in the north-bound and three in the south-bound shed) operate on heavy "I" beam trolley tracks handling freight from cars to vessels or vice versa.

The city delivery shed for handling wagon freight will be a brick and steel structure adjoining and connecting with the south-bound shed. It will be 782 feet long by 63 feet wide, covering an area of 49,266 square feet. The office building will also be of brick and steel construction, 175 feet long by 52 feet wide and two stories high. The waiting rooms for passengers will be on the second floor of the office building, from which galleries suspended from the roof trusses lead to the landing stages at steamer berths and to a mezzanine gallery at the sea end of the sheds. This enables passengers to reach the steamers without coming into contact with the freight-filled platform below and also by using the gallery arriving and departing passengers can be greeted by their friends. The total area covered by this proposed work is about twenty acres.

The new terminal will give the Ocean Steamship Company splendid facilities for handling both passengers and freight at Savannah and should prove of great benefit to the southern port.

The Cunard Steamship Company have replaced the steamers formerly in the Canadian trade but requisitioned by the British government by the "Franconia," "Transylvania" and the "Orduma," the latter vessel being one of the Royal Mail Steam Packet Company's splendid South American liners.

The Houston ship canal, recently opened, has a width of 100 feet at the bottom of channel and a minimum depth of 25 feet throughout its length. The municipality of Houston has issued bonds for $3,000,000 as a preliminary fund for the construction of wharves and other shipping facilities.

The Fidalgo Island Packing Company are having a powerful cannery tender constructed at the yards of John Wilson on the East Waterway, Seattle. The craft will be 75 by 18 feet in size and will be equipped with a four-cylinder, 150 horsepower, Frisco Standard engine. L. E. Geary is the naval architect.

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THE NEW YEAR.

THE year 1914 is now ready to step over the border line of the present into the first shadow of the past. During its stay with us there has been much to be thankful for and much to be sad over. A European war that is destined to loom large in the annals of the future has made itself felt even at the western portals of our continent, but it appears that we will be able to weather the gale without being driven onto the lee shore of participation in a struggle which can hardly result in any tangible good for any of the countries concerned.

On the Pacific Coast the outlook is particularly bright on account of the fact that as far as America is concerned, our two expositions will be the greatest attractions presented to the citizens of the United States during the year. Europe is effectively cut off as a field for tourist travel and the great exodus that takes place every season from our Eastern seaboard will this year have the Pacific Coast as its objective. What this means can best be realized by considering what the Pacific Coast has to offer to that element amongst our visitors who are looking for a new home. Every great transcontinental railroad will bring its quota and surely with streams of strangers flowing through British Columbia, Washington, Oregon and California a goodly proportion of them will see a country to their liking and decide to cast in their lot with those who dwell by the "Great Waters."

The merchant marine has also much to be thankful for. The people of this nation have turned their faces to the sea with a new understanding of its needs and theirs. Gradually it is coming home to them that a fair share in their own foreign carrying trade is not only a thing worth striving for, but also an object that must be achieved if the country's balance is to stay on the right side of the ledger for many years more. Perhaps we are too optimistic, but we believe that the coming year will see but little adverse legislation for shipping interests.

To one and all of you a happy Christmas and a bright, and prosperous New Year is the sincere wish of the **"Pacific Marine Review."**

ON BARNACLES.

What is a barnacle? According to Shipping Illustrated, a New York publication, a barnacle is an advocate of ship subsidies. The editor of Shipping Illustrated also calls the subsidy advocate a grafter, but only does so half-heartedly laying more stress on the barnacle idea. Since, right or wrong, some of the ablest men in this country have advocated ship subsidies, including over fifty per cent. of the men who have occupied the Presidential chair, we must disagree with the "barnacle" ideas of our contemporary. Just why Great Britain, which has built up the greatest foreign trade merchant marine the world has ever known, persists in the foolish, criminal and trust creating practice of giving mail subsidies to a part of her merchant marine we do not know, but "dern" her she does.

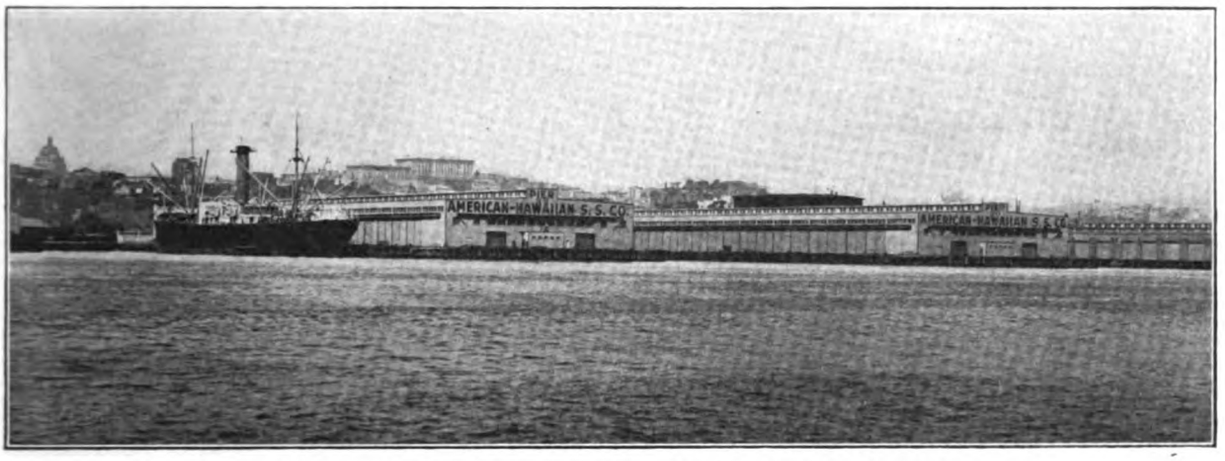
Ship subsidies, discrimating duties, Government ownership, or the establishment of a Government Mortgage Bank, originated by "Shipping Illustrated," have each and all a respectful and honest purposed following and any scheme to aid the merchant marine that comes up in the future will also receive its following. It appears to us that "Shipping Illustrated" is guilty of the very fault that it ascribes to others. In substance the charge is made that the subsidy advocates have been flim-flaming the public for years and then a "cure-all" is offered in the form of a Mortgage Bank. If we cannot see the merits of this Mortgage Bank then we are totally blind. Such an attitude on the part of such a paper as "Shipping Illustrated" is deplorable. If those who advocate different remedies for our foreign trade merchant marine are to expend all their energy in calling each other barnacles or toredos the results of the next thirty years of agitation will be equal to the results of the past thirty years of agitation and that will be no results at all.

THE TRAVELING INSPECTOR.

The Department of Commerce has installed a traveling steamship inspector. This is one of those queer departmental actions for which no one can ascribe a reason. If there was anything calculated to make the steamboat inspection service unpopular with shipmaster and shipowner alike it was just this. It will give rise to innumerable petty jealousies between the shore inspector and the floating inspector and the trouble, delay and expense of these quarrels will all have to be borne by the shipowner. There would be the continual question of rank and precedence. The floating inspector, being on the job under actual working conditions, would feel himself highly superior to the man who merely gave the vessel a going over alongside the dock. On board the ship herself he would be looked upon by both the captain and the chief engineer as an unmitigated nuisance or, on the other hand, he would toady to the officers and allow himself to be easily gulled. In either case he would serve no good purpose on board.

This traveling inspector is not to be required to let either the officers of a ship or her owners know that he is present but may come on board as a passenger and act the part of a common detective. The result of such action is inevitable. A service that is now a credit and which has never had any really serious charges brought against it will take a decided drop in the opinion of steamship people who will look upon with suspicion what they now regard with respect.

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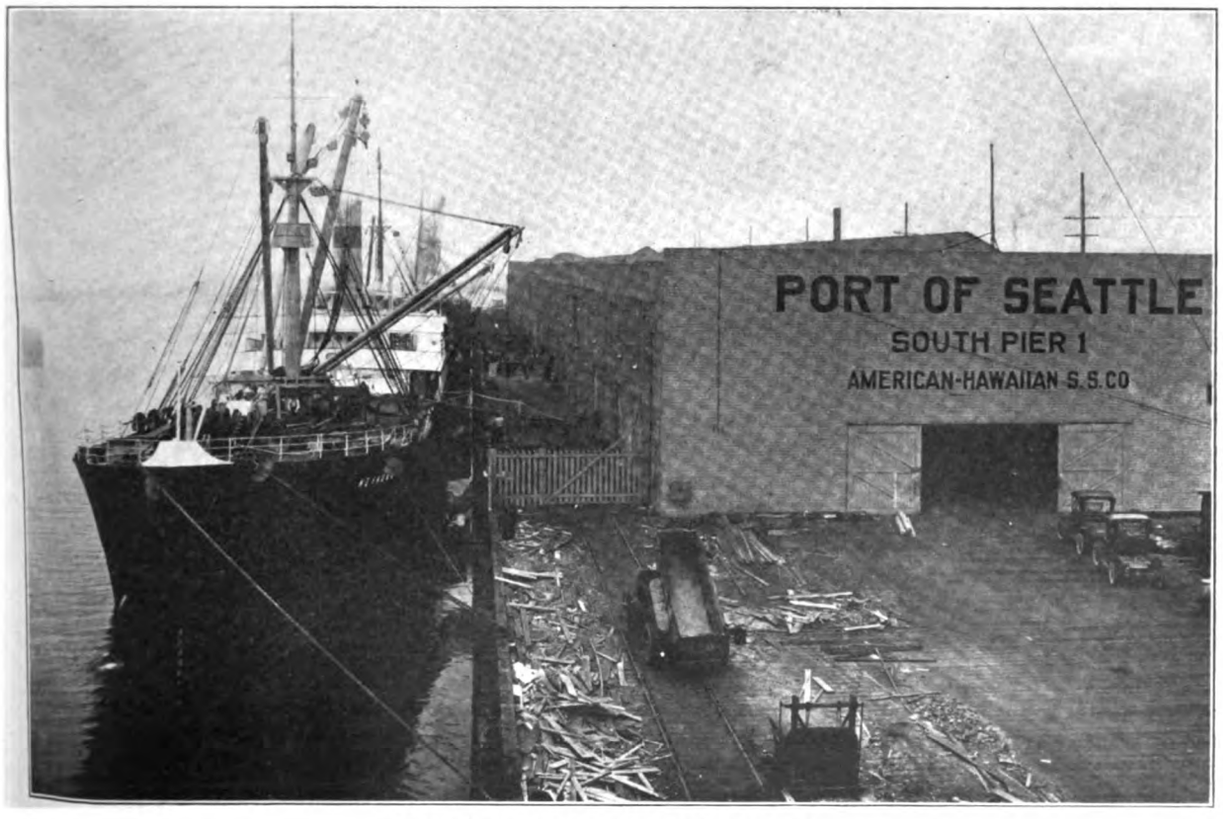


The water side of the American-Hawaiian Docks at San Francisco.

The American-Hawaiian Steamship Company

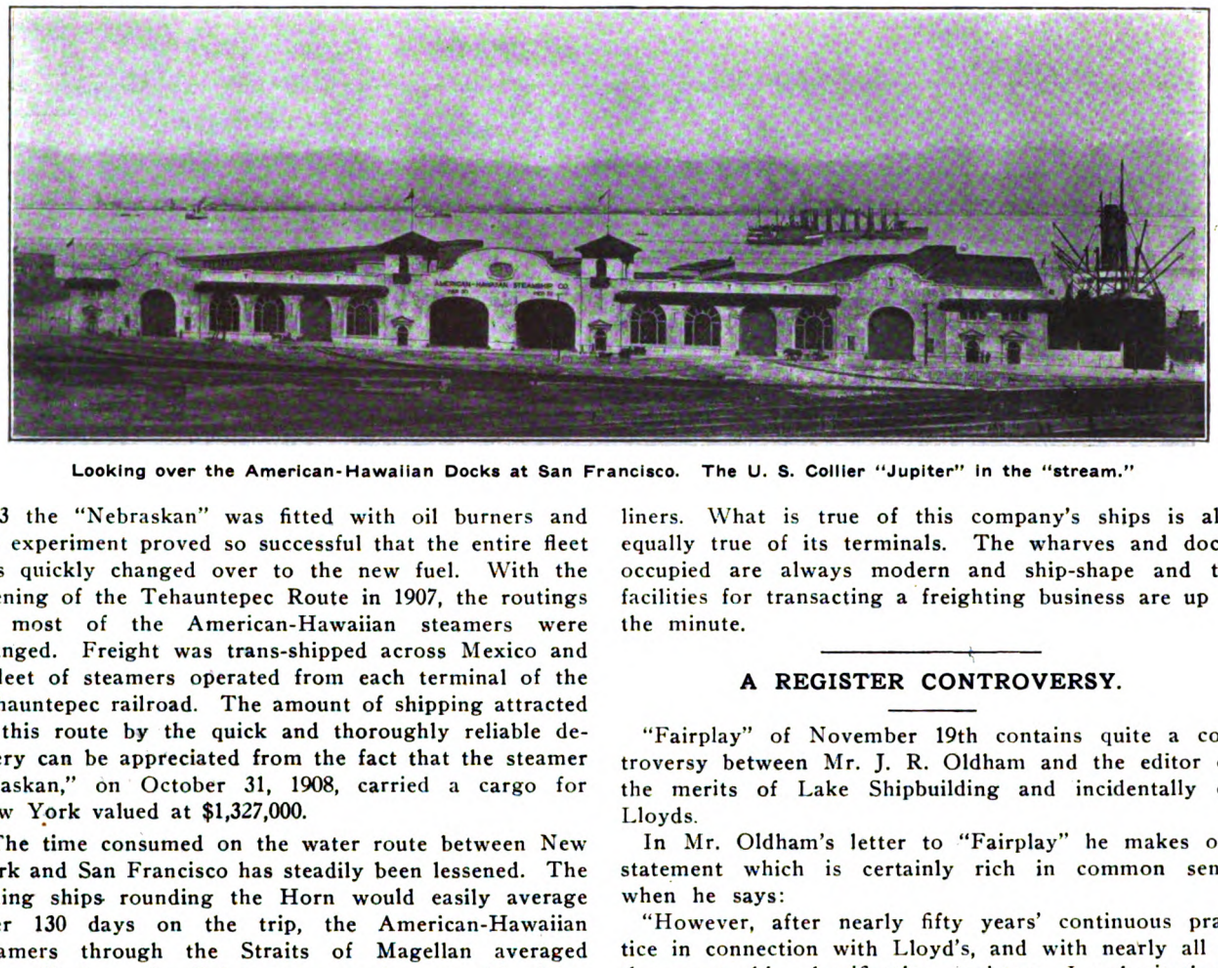
SLIGHTLY over fifteen years ago some business men, who had been for years engaged in transportation by means of the celebrated old American clipper ships between New York, San Francisco and the Hawaiian Islands, began to seriously study the possibilities in the way of freights by steamer on the all-water route from San Francisco and the Islands to New York. The result of their deliberations was the American-Hawaiian Steamship Company. This new corporation immediately set about the acquisition of a fleet, not by chartering second-hand tonnage, but by building new steamers specially designed to meet the needs of the trade in which they were to be employed. The keels of the first two boats, the "American" and the "Californian," were quickly laid, the former at Philadelphia and the latter at the Union Iron Works, San Francisco. The "Californian" was delivered first and, owing to delay in completing the "American," the steamer "Hyades" was chartered to make the first westbound voyage of the new line. This vessel arrived at San Francisco in December, 1900, using the route through the Straits of Magellan. By August, 1901, a splendid start had been made, four fine steamers being employed in the service and four more being built in American shipyards. The route quickly became popular with shippers on account of its reliability, the time consumed between New York and San Francisco hardly ever departing from between 59 and 65 days.

New vessels were added to the American-Hawaiian fleet from time to time and this new tonnage invariably represented high class freighters built to the order of the company and designed specially for their trade. In



The Seattle terminal of the big freighters.

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Looking over the American-Hawaiian Docks at San Francisco. The U. S. Collier "Jupiter" in the "stream."

1903 the "Nebraskan" was fitted with oil burners and the experiment proved so successful that the entire fleet was quickly changed over to the new fuel. With the opening of the Tehauntepec Route in 1907, the routings of most of the American-Hawaiian steamers were changed. Freight was trans-shipped across Mexico and a fleet of steamers operated from each terminal of the Tehauntepec railroad. The amount of shipping attracted to this route by the quick and thoroughly reliable delivery can be appreciated from the fact that the steamer "Alaskan," on October 31, 1908, carried a cargo for New York valued at $1,327,000.

The time consumed on the water route between New York and San Francisco has steadily been lessened. The sailing ships rounding the Horn would easily average over 130 days on the trip, the American-Hawaiian steamers through the Straits of Magellan averaged about 62 days, the Tehauntepec routing cut this down to 30 days and finally with the opening of the Panama Canal and the routing of the steamers direct to the destination of their cargoes further lowered the time consumed until freight can now be landed in San Francisco by water from New York in 23 days or even less.

The present fleet of the American-Hawaiian Steamship Company, all built in American shipyards and all flying the American flag, consists of twenty-six steamers, as follows: The "Isthmian," "Nebraskan" and "Nevadan," each of 6000 tons capacity; the "American," "Californian," "Hawaiian," "Oregonian" and "Honolulan," each of 8000 tons; the "Dakotan," Kentuckian," "Minnesotan," "Pennsylvanian," "Washingtonian," "Panaman," "Georgian," "Montanan," "Iowan" and "Ohioan," each of 10,000 tons, and the "Kansan," "Texan," "Alaskan," "Arizonan," "Columbian," "Mexican," "Missourian" and "Virginian," each of 12,000 tons. Six of these steamers are fitted with the most modern refrigerating equipment capable of maintaining any degree of temperature for all classes of perishable freight, the combined refrigerating capacity being about 10,000 tons. It is very doubtful if there exists in the world to-day as fine a fleet of freighters as is represented in the above list.

The secret of the American-Hawaiian Steamship Company's great success lies primarily in the fact that proper tools were secured to carry out the work proposed. A fleet of splendid freighters has been built up and these ships are fitted with the most modern and efficient machinery for the rapid loading and discharging of cargo. At all times the vessels are held to the highest standards of efficiency, being as carefully looked after in every detail as if they were the highest class of passenger liners. What is true of this company's ships is also equally true of its terminals. The wharves and docks occupied are always modern and ship-shape and the facilities for transacting a freighting business are up to the minute.

A REGISTER CONTROVERSY.

"Fairplay" of November 19th contains quite a controversy between Mr. J. R. Oldham and the editor on the merits of Lake Shipbuilding and incidentally on Lloyds.

In Mr. Oldham's letter to "Fairplay" he makes one statement which is certainly rich in common sense when he says:

"However, after nearly fifty years' continuous practice in connection with Lloyd's, and with nearly all of the great ship classification registers, I unhesitatingly predicate that sound construction depends on the system established in the shipyard. I know shipbuilders who never built a bad ship; and I know others who never built a good iron vessel. In the former example supervision was almost superfluous; in the latter it was practically useless."

In regard to "Fairplay's" repeated intimation of poor workmanship in American-built vessels, such a statement is pure rubbish. The design of lake vessels may be at fault (on this subject we are not sufficiently versed to express an opinion, but presume that the editor of "Fairplay" is highly familiar with the lake carrier and the conditions under which she operates), but there was no evidence of faulty workmanship brought to light in the recent disastrous storm on the lakes. The question of superiority of workmanship is purely an individual one and if a snap judgment be taken by going down to any American harbor and examining in turn a British and an American-built freighter we are perfectly willing to abide by the results.

The largest inland dry dock in the United States was recently completed at Keokuk, Iowa. The dock is 463 feet long, 150 feet wide and 56 feet deep, and will be used by the larger river craft on the Mississippi, Missouri and Ohio rivers.

The last of November witnessed the launching of the new river steamer "Sacramento" from the yards of Roberts & Schultze in South San Francisco. The new boat, which is 210 feet long, will ply between the Capital City and Colusa.

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An Early Event in Our History

NOW it came to pass in the good old days when the cows and chickens and stag and pigs and divers kinds of wild and ferocious fowls of the air and beasts of the sea wandered at will over the wide meadows of California, that a certain wise and sportive Gazabo yclept Gaspar de Portola was one day perusing his morning newspaper and noted that the good old passage known as the Golden Gate had not been discovered yet. So bidding a fond and tearful farewell to Mrs. Gasp and the kids he bought him a season ticket on the next galleon and with a picked crew of cut-throats sailed away northward on the broad Pacific Ocean. The voyage took many days for some of the sailors got careless and left the hatch open so that the wind fell down and they were becalmed for many weeks. However, the journey was finally accomplished and one bright morning found the adventurous explorers outside the Cliff House barking joyously in answer to the seals. The hopes of the intrepid leader were to be nipped in the bud however, for just as he prepared to name the new found entrance to the future El Dorado the Straits of Gaspar de Septimo, after his seventh son, who was making a lot of noise at the time, being teething, a long lean, rakish looking craft appeared from behind a jutting headland and the next moment the galleon was boarded by a jovial looking mariner who announced himself as the pilot and proceeded to strip poor Gaspar of all the simoleons he had concealed about his person. This personage informed our wilting and dejected hero that the entrance had already been discovered and that it was named the Golden Gate and that he and his brother pilots were seeing to it that it did not belie its name. Gaspar now began to appreciate the situation but by the time he was boarded by the Hartley and had

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got a peep at the morning "Excema," kindly loaned him by the quarantine officer, he received a fresh shock when he discovered that the entire front page was covered with an account of his impending visit. The doctor gave him a shot in the arm and then informed him that his coming had been heralded by wireless and that Joseph Joles was heading a reception committee which would meet him on shore. Gaspar returned southward on the next steamer a sadder and a wiser man and always maintained that the inhabitants of the strange community he visited consisted almost entirely of commissioners, at least the number of commissions he had to pay on his galleon was so great that he finally traded his equity in the ship and his two oldest children for a steerage ticket home. All of which leads us to the inevitable conclusion that the life of an explorer is not all grape juice and buns and also that a good action is never thrown away.

New Wharf at Santa Cruz

AMID the din of ringing bells and shrieking whistles, the new half-mile Municipal Wharf of Santa Cruz was opened to traffic Saturday, December 5th. The North Pacific S. S. "Roanoke," by special arrangement with the company, tied up to the dock at noon on her trip to Los Angeles from San Francisco and unloaded specially consigned freight to Santa Cruz merchants—365,000 pounds in all—as well as a crowd of through passengers from northern cities and a group of Santa Cruz merchants who had gone to San Francisco especially to make the trip down on the boat. Captain Dickson, officers, crew and passengers were made the guests of the city at a bountiful luncheon spread on tables in the big warehouse at the docking end of the pier.

The new wharf at Santa Cruz is a creosote pile structure 2732 feet long, reaching out to a point in the harbor protected by Lighthouse Point. The docking end of the structure is 500 feet long and 80 feet wide, and the water at low tide is 30 feet deep, insuring absolute safety for the larger vessels in landing. At the shore end 825 feet is 42 feet wide, a portion of the width being fenced off for promenade purposes with several concession houses constructed along it.

The City of Santa Cruz voted bonds in December, 1913, to the amount of $165,000 for the utility, the vote polled being 3734 for the bonds and only 74 against, a ratio of 46 to 1, the most remarkable vote on a bond issue in the history of California municipalities.

With its construction the first opportunty in many years is presented for an outlet by water for the industrial products raised and manufactured in the City and County of Santa Cruz. The first wharf to be built at Santa Cruz dates back to 1870 and was erected by Goodall & Perkins, who operated the steamer "Santa Cruz" between there and San Francisco. The "Santa Cruz" was of great interest to marine engineers when she was first built as she was a twin screw boat and fitted with a pair of caterpillar engines. Everything on these engines was in motion with the exception of the bed plate, and Captain Charles Goodall used to remark that it must have been a remarkable mechanic who could set so many things in motion without having them hit each other. The ship did not operate, however, for many weeks before the engines did get into a wild tangle that could not be unraveled, and so a new set of engines was constructed.

The important shipments which will be handled over the new wharf will be apples from the Santa Cruz hills and the Pajaro Valley, lumber, lime, cement, bitumen, leather, fish, dairy and poultry products. The fish shipments alone out of Santa Cruz amount to 3,000,000 pounds annually.

The creation of a substantial traffic by water over the new pier at Santa Cruz will result in a reduction and equalization of all excessive transportation rates in and around Santa Cruz; will open up an opportunity for industrial expansion heretofore a badly stunted growth, and will finally result in government recognition for a breakwater protection of the harbor.

The Santa Cruz Municipal Wharf is the second longest of its type on the Pacific Coast and is the only structure on Monterey Bay where it is possible to actually load freight from cars to steamer without extra handling. It was built by the citizens, not as a revenue producer on the amount invested, but for its value as an indirect means of improving the commercial strength and future growth of the city.

HAWKE CASE DISPOSED OF.

The collision of the British cruiser "Hawke" with the White Star liner "Olympic" in the Solent in 1911 aroused extraordinary interest among naval architects and gave rise to much discussion as to the actual forces exerted by two vessels traveling in the same direction and near enough to each other to be affected by the eddies and currents set up in the water. The Court of Appeals decided that the "Olympic" was solely to blame for the collision and the owners of the "Olympic" appealed from this decision to the House of Lords. Lord Atkinson, Lord Shaw and Lord Sumner dismissed the appeal on November 9th on the grounds that the "Hawke" was not the overtaking ship and that the burden laid upon the "Olympic" to prove this had not been discharged. Lord Atkinson in his concurring opinion said: "When the vessels were close together the 'Hawke' swerved under some powerful external force and in porting her helm to counteract this force, it jammed. She was not to be held to blame for this, as it was done in the agony of impending collision."

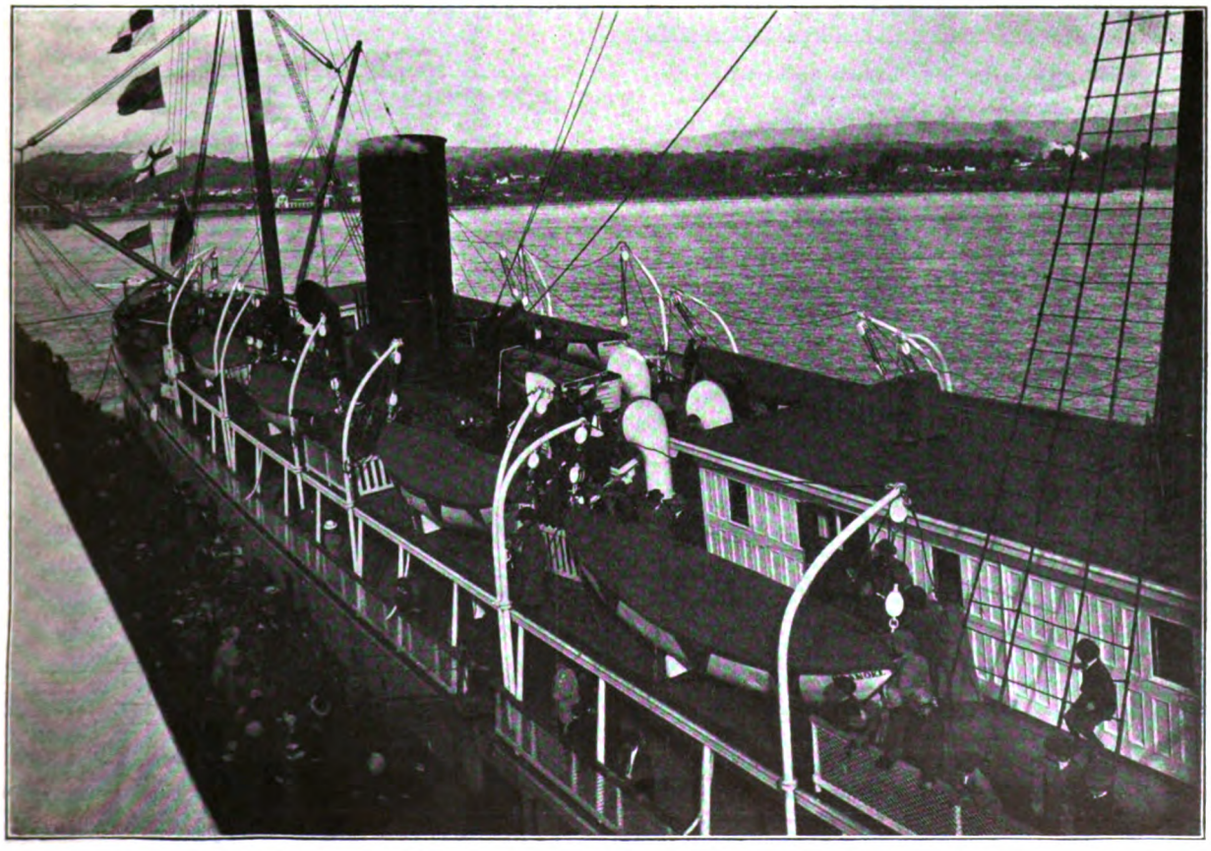
The steamers "John D. Archbold" and "John D. Rockefeller," the largest American tank vessels carrying petroleum in bulk, were recently coated with Anti-Corrosive, Anti-Fouling, Boottopping and Topside Gray, manufactured by the Von Hoveling American Composition Company of 17 Battery place, New York. In this connection it is interesting to note that in 1913 Von Hoveling Compositions were used on vessels that if put end to end would make a line 250 miles long. Among the interesting applications was the coating of the steam yacht "Arrow," which has developed a speed of 45 miles per hour.

The Kneass Shipbuilding plant which is located just north of the Union Iron Works' property and which was recently destroyed by fire, is to be entirely rebuilt on a larger scale.

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Looking towards the City of Santa Cruz from near the outer end of the new municipal wharf.



The steamer "Roanoke" of the E. J. Dodge Steamship Company, the first vessel to dock at the new wharf.

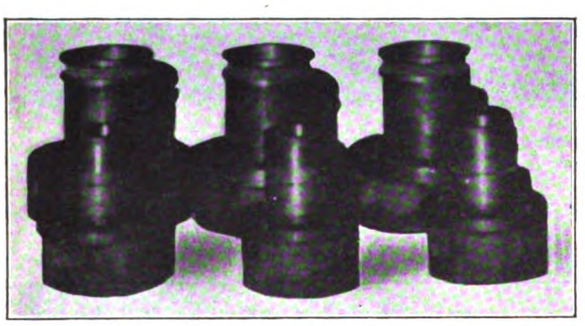
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With Those Who Do Things

E. W. Tucker & Company are the pioneers in the manufacture of metallic packings and oil burning systems on the Pacific Coast. The head of this firm, realizing the necessity of having a metallic packing that would act automatically as near as possible and adjust itself to the conditions under which the engine was working and prevent the necessity of stopping at sea for overhauling under hot cylinders and other circumstances which the engineer will always try to avoid, invented the self-adjusting metallic packing that bears his name and which is used by nearly all the steamship companies on this Coast.

Edwin W. Tucker, the head of the firm, is a marine engineer of wide experience, having spent twenty years at sea and also having supervised the designing and installation of many large plants both at home and abroad. He was the first apprentice at the old Risdon Iron Works, a concern that turned out many fine engineers, and he joined the service of the Pacific Mail Steamship Company in 1873.

In 1902 E. W. Tucker & Company installed the first oil-burning plant in an ocean-going steamship, that



Some packing for the "Lyman Stewart."

vessel being the Oceanic Steamship Company's "Mariposa" of 2500 I.H.P., operating between San Francisco and Tahiti. This installation attracted world-wide attention not only on account of the change from coal to oil, but also due to the fact that the ship was compelled to carry fuel for the round trip, the only fuel to be had at Tahiti being coal. The Government deemed the matter to be of such importance that Rear-Admiral George W. Melville, then Chief Engineer of the Navy, detailed the chief engineer of the cruiser "Boston" to make the round trip on the Mariposa. The report of this officer was published by the Department of Engineering, United States Navy.

The firm of E. W. Tucker & Company started business in 1886 and were continually located at one place until their plant was completely destroyed in the great fire of 1906. Within ten days business was resumed in the best manner possible while waiting for new tools from the East. In order to provide proper facilities for the rapidly growing business, the firm found it necessary to secure larger quarters and therefore acquired a piece of property in the heart of the business section of San Francisco and erected thereon a building suitable to their requirements. The new shops have been equipped with all the latest and best tools and the firm is able to meet all orders promptly and efficiently. Friends and patrons are always welcome at the plant which is the equal of any in this line of business on the Pacific Coast.

AMERICAN ENGINEERING COMPANY.

The American Engineering Company of Philadelphia have lately furnished the following deck equipment which is of interest to Pacific Coast shipowners, masters and engineers:

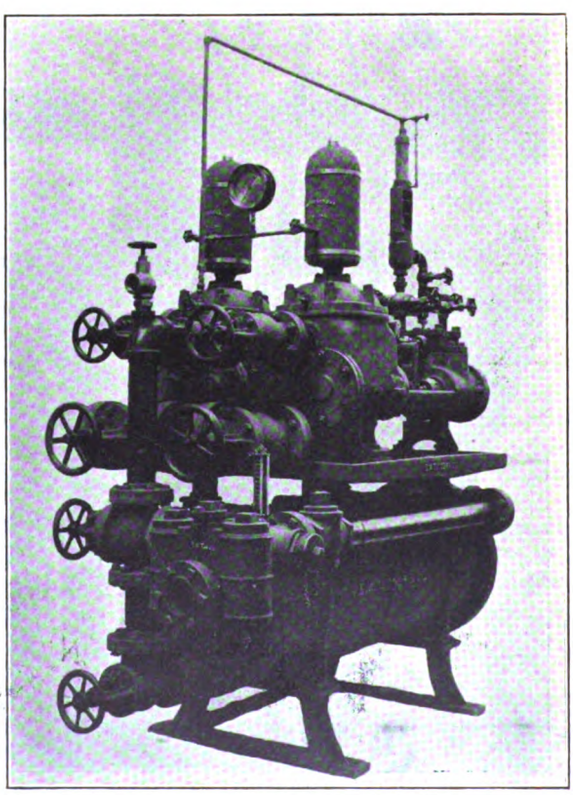
The steamers "Great Northern" and "Northern Pacific" were supplied with Providence spur geared steam windlasses, Williamson differential steering gears, eight single drum steam hoists, two warping hoists, eight improved dock steam gypseys and eight electric elevator hoists.

The "Maumee" and the "Kanawha," Navy tankers now nearing completion at Mare Island, were supplied with No. F Providence automatic steam towing machines with winding devices and auxiliary shafts with gypsey heads suitable for handling 2-inch wire towing hawsers.

The United States barge number 23 at the Puget Sound Navy Yard was fitted with a tug boat type of windlass with iron towing bitts combined.

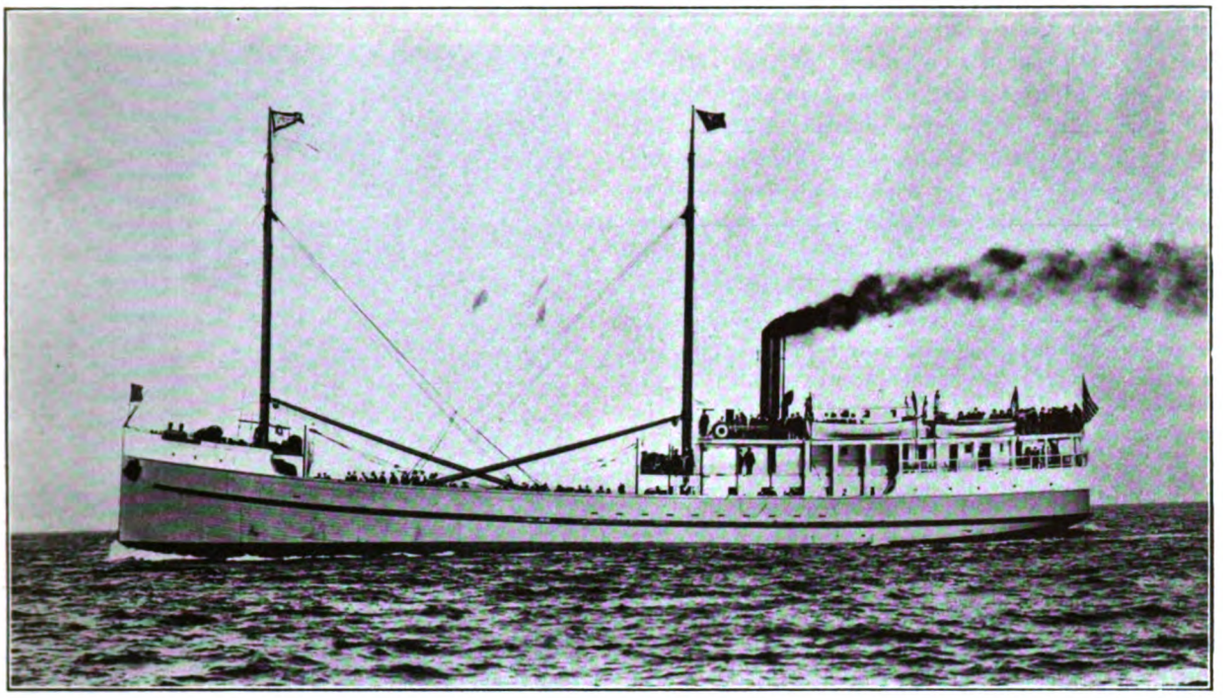
The U. S. Government tug number 81, built by the Seattle Construction & Dry Dock Company, has been fitted with a combined hand and steam steering engine of the Williamson make.

The W. R. Grace & Company's steamers "Santa Cecilia," "Santa Catalina" and "Santa Clara" were fitted with Providence spur geared steam windlasses and Williamson steam steering engines of the screw gear type and each of these boats has nine 10" by 12" steam hoists and two 9" by 10" steam hoists.



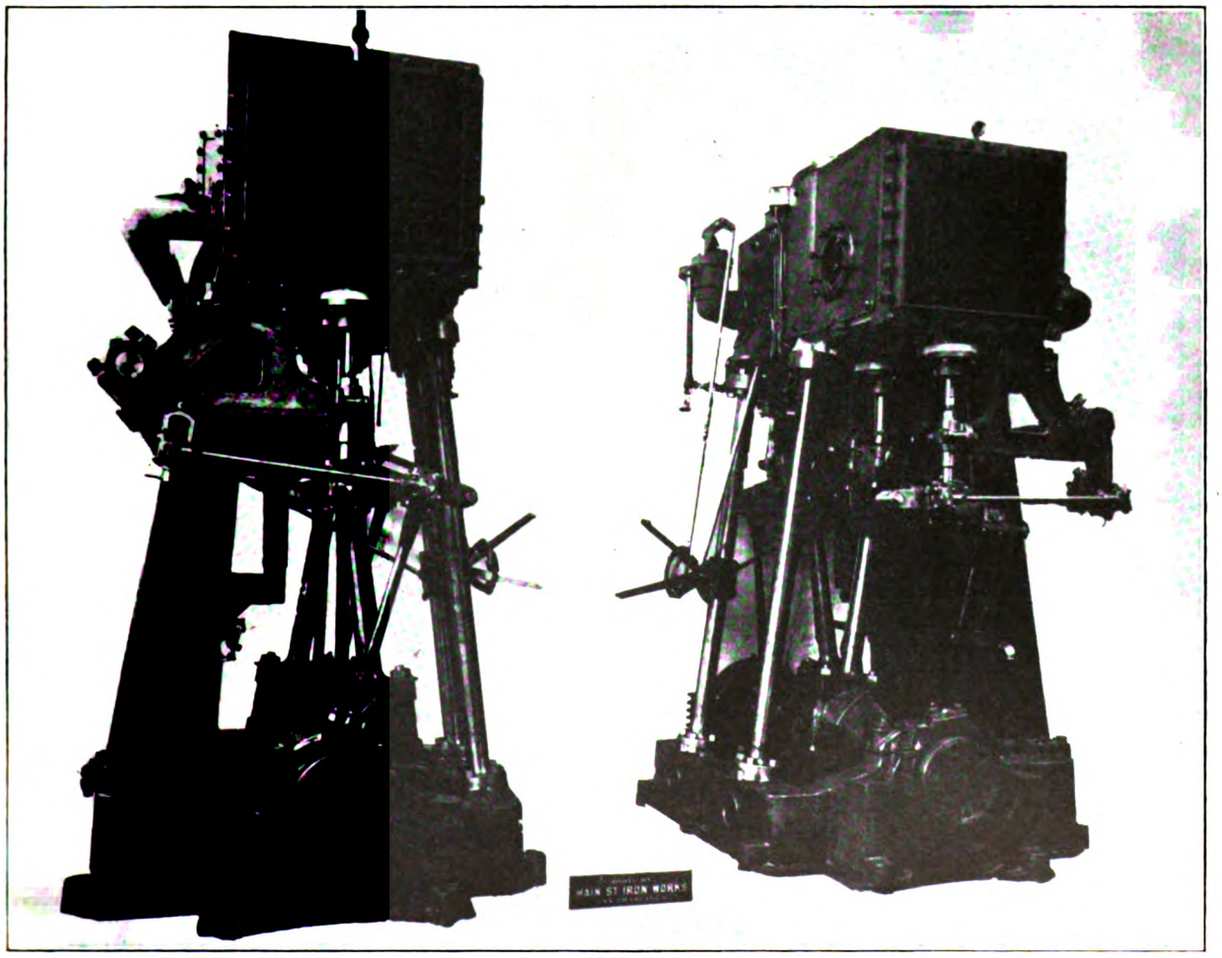
Duplex Oil Pump built by E. W. Tucker & Co.

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The "Speedwell's" Engines

THE Main Street Iron Works has always held a fine reputation among steamship owners as a producer of high grade engines and many a staunch steam schooner bears witness to this firm's good workmanship in her engine room. The twin engines pictured herewith were put into the steamer "Speedwell" and are typical of the sturdy and serviceable compound engines that have long been the favorite type for small and

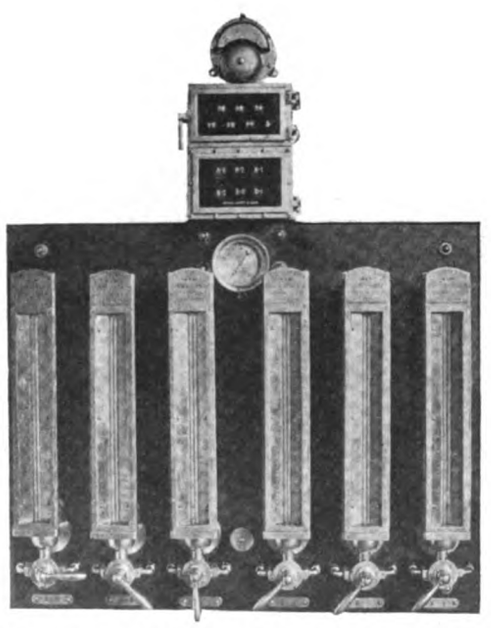


The twin engines of the steamer "Speedwell."

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medium powered steam schooners. The stroke of these engines is 20″ and the cylinders 15″ and 32″ in diameter, with a piston valve on the high and a double ported slide valve on the low pressure piston. The condenser is independent of the engine framing and the combined air and circulating pump is also independent, being driven by a vertical 6″ by 6″ engine. The ordinary Stevenson double link valve gear is employed and the engines are fitted with steam reversing cylinders. Steam is supplied by two Scotch marine boilers 9′ 6″ in diameter and 12′ 0″ long, with two furnaces each, and fitted as oil burners. The boilers were supplied by the Manitowoc Boiler Works of Manitowoc, Wisconsin. The boilers are set abreast and the oil fuel is carried in four tanks, two of which are abreast of and two forward of the boilers. The deck machinery includes two Main Street Iron Works double drum friction cargo hoists, a 5″ by 7″ deck type capstan and an 8″ by 8″ anchor hoist. On her trial the "Speedwell" made eleven and one-half knots on 850 I. H. P., and has been operating since with perfect satisfaction in the engine-room.

The "Speedwell," owned by the A. F. Estabrook Company, is a wooden steamer built at North Bend, Oregon, by Kruse & Banks, and is of 914 gross and 574 net tons register, her lumber capacity is a million and a half board feet. She is 200″ long, 42′ 0″ beam, and 12′ 2″ deep, being built for crossing shallow bars, her draft lumber laden is only 14′ 6″.



One of the sets of Model T-I Pneumercator installed on the Argentine Battleship "Rivadavia." Similar equipment is being installed on the U. S. S. "Oklahoma" and "Pennsylvania."



LEWIS A. MASON.

Mr. Lewis A. Mason, formerly an assistant designing engineer in the Panama Canal work, recently resigned from the canal service owing to the completion of the work. For a little over six years he was prominently connected with the designing and construction work in connection with the miter lock gates, chain fenders or lock gate protective devices and the lock entrance caisson for the Panama Canal.

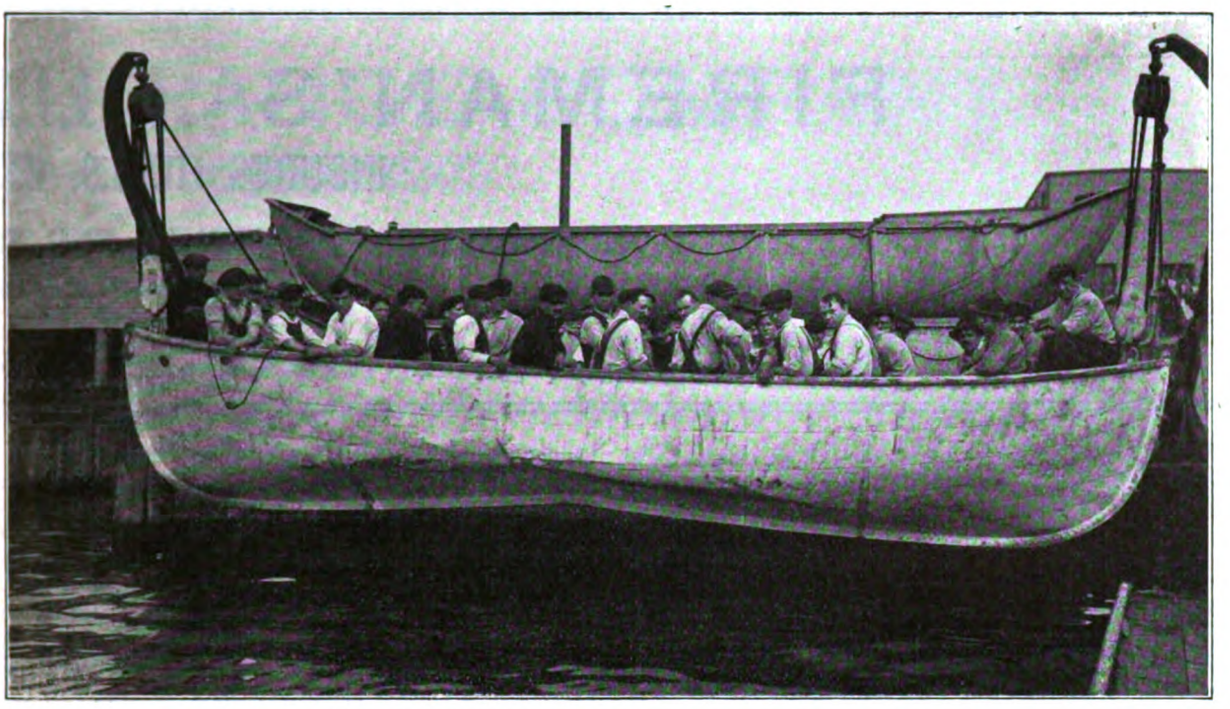
As the representative of the chief engineer of the canal, Mr. Mason had charge of the construction of the lock entrance caisson at the plant of its builders, the Union Iron Works of San Francisco, during the last year of his Government service.

Prior to his connection with the great engineering problems at the Canal, Mr. Mason spent about nine years with shipbuilding firms on the Great Lakes and the Atlantic coast and three years with the American Bridge Company of Pittsburg.

Mr. Mason has now opened an office in the Mills Building, San Francisco, and will devote his time to naval architecture and ship brokerage work. During his short stay in San Francisco, Mr. Mason has made a wide circle of friends and the Pacific Marine Review wishes him a full measure of success in his chosen line here.

The Ocean Marine Insurance Co. Ltd.
of London
H. M. NEWHALL & CO., General Agents
T. S. DEERING, Underwriter
NEWHALL BUILDING SAN FRANCISCO

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The "stove-in" lifeboat being tested for seaworthiness.

AN INTERESTING REPAIR JOB.

The accompanying illustrations furnish a valuable object lesson of the advantages of all-steel lifeboats. The craft is the ordinary 26-foot, steel keel, metallic lifeboat of Welin Marine Equipment Company manufacture, and as will be seen had received a blow of great force from some source, crushing in the keel and the steel plating. While the apparent damage is very great, this boat when it arrived at the Welin Marine Equipment Company for repairs was easily and quickly repaired. Before repairing it, however, it was placed in the water and loaded with its rated number of people. There was no leak and the little craft was perfectly seaworthy.

The stem, stern piece and keel of this type of lifeboat is made all in one piece, with the result that severe treatment is far less liable to make a boat useless and there is not the danger of the riveting pulling loose that there is in the metallic boats with wood keels.

The regulations permit of wood keels on metallic lifeboats, but the Welin Marine Equipment Company has given up this practice on the alleged ground that by making the stem, stern post and keel of steel and in one piece, that a much stronger construction is secured, the boat made far stiffer, and repairs are reduced to a minimum.

Referring to regulations, there are some new rules affecting lifeboat equipment, two of the important ones being as follows:

Davits—Page 75, Paragraph 3.

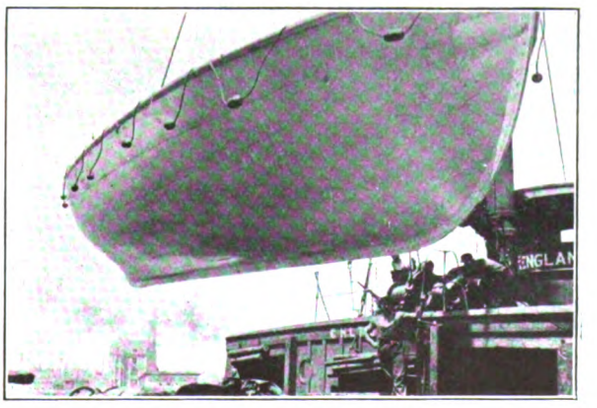
"On and after January 1, 1915, all ocean and coastwise steamers carrying passengers shall be equipped with at least one pair of davits on each side of the vessel by which the boats under such davits may be put out clear of the side by mechanical appliances that can be operated by one man at each davit: Provided, however, that the mechanical davits above mentioned shall not apply to vessels of 750 gross tons and under."

Power Lifeboats—Page 65, Paragraph 3.

"On and after January 1, 1915, all ocean steam vessels of over 2,500 gross tons carrying passengers and whose course carries them 200 miles or more off shore, shall be required to be equipped with not less than one motor-propelled lifeboat as a part of their lifeboat equipment: Provided, however, that any vessel under the jurisdiction of the service may be allowed to carry one motor-propelled lifeboat as a part of the lifeboat equipment required on such steamer, except that on steamers carrying more than six lifeboats under davits, two of such lifeboats may be equipped with motors."

These new rules and regulations go into effect on January 1, 1915, and have made it necessary for steamship companies to consider changes in their lifeboat and davit equipment in order to comply with the law. The Welin Marine Equipment Company with their Welin quadrant davits and Lundin powered lifeboats are singularly well fitted to supply the equipment necessary to meet the new rules and regulations.

In cases where the units outlined above are too costly and where a cheaper, if less efficient, outfit is advisable, the Welin Marine Equipment Company is prepared to furnish other types of mechanical davits as well as mechanical apparatus for swinging the old type round bar davit. This company has also designed several types



The same boat as above with steel keel straightened out.

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FIREMAN'S FUND
INSURES HULLS, CARGOES,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

of powered lifeboat aside from the Lundin type. The regulation in regard to powered lifeboats is not very specific as to requirements.

NLSECO FIRM BUSY.

During the past month the New London Ship & Engine Co. have booked orders for over sixty engines of 180 and 240 h.p., standard commercial, low-speed, heavy duty type, and for fifty-six engines of 500 h.p. each, which are of the high speed, light weight type.

The commercial engines are of similar design to the 120 h.p. four-cylinder engine installed at Seattle last spring, through the company's Pacific Coast branch, in the cannery tender "Warrior," which made such a satisfactory showing during the past season, and the 180 h.p. six-cylinder engine recently installed in the Puget Sound passenger boat "Suquamish." Another engine of this standard design, a four-cylinder 240 h.p. unit, will shortly be installed in a heavy tug now nearing completion at Nelson & Kelez (Seattle) yard.

A splendid example of the possibilities of the Diesel engine for large, ocean-going vessels was shown by the recent visit to Washington and California ports of the motorship "Malakka," of the Danish East Asiatic Company's fleet. This splendid vessel is a sister ship to the motorship "Siam," which visited Pacific Coast ports last winter. Her engines were built by Burmeister & Wain. Her power plant consists of two six-cylinder units of 1550 h. p. each and three auxiliary sets of 90 h.p. each. This is the "Malakka's" maiden voyage and though it extended over a period of practically three months, her engines gave no trouble whatever and but a few hours' cleaning was necessary to put them in shape for the return voyage. The "Malakka" will be followed within a month by the motorship "Jutlandia" and later by the "Falstria," both of the same line.

While at San Pedro the "Malakka" took on 1200 tons



The injured boat in the water loaded to her full legal capacity.

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INSURANCE COMPANY
FREIGHTS AND DISBURSEMENTS
STREETS, SAN FRANCISCO, CALIFORNIA
W. H. WOODRUFF, Special Agent
220 BYRNE BUILDING
LOS ANGELES, CALIFORNIA
F. HERRMANN & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK
AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

of Star fuel oil, an ample supply for the voyage from that port to Copenhagen and back to Puget Sound. The Swedish motorship "Kronprinz Gustav Adolph," which called at San Francisco in October, was fueled with 5500 barrels of this same Star fuel oil, which is enough to take her to Europe and back to San Francisco.

It is learned from a reliable source that the New London Ship & Engine Co. and Electric Boat Co., combined, have in hand at the present time orders for slow-speed commercial engines, highspeed naval engines, and submarines, which in amount total over $12,500,000.

MOORE & SCOTT.

Moore & Scott have recently been quite busy on repair work, both hull and machinery, as is shown by the following list of recent jobs completed at their Oakland yards:

Key Route steamer "San Francisco" was drydocked to receive a new tail shaft and rudder.

Steamer "Manila," owned by J. W. Strong, has been at the yard for the past two months receiving a thorough overhauling. She will be placed on the dock for rudder repairs before proceeding south.

Schooner "Snow & Burgess" is to be docked and the bottom stripped of all old copper and re-coppered. She will be recaulked throughout.

Extensive repairs and alterations are being made to the dredger "City of Oakland."

The steamer "Svea," owned by Wilson Bros., was sent to the yard for repairs to her bow, due to damage received in collision with the "Adeline Smith."

Steamer "Melville Dollar" has had her forward tanks cleaned out and all slack rivets redriven.

Tug "Sea Lark," owned by the Red Stack Towboat Company, had the Erickson improved oil burning system installed and is operating with entire satisfaction.

The "Rainier," owned by the Pollard Steamship Company, had her donkey boiler retubed.

The American bark "Santa Clara" was placed on the drydock and stripped, caulked throughout and recoppered up to the water line.

The pilot boat "Gracie S." was laid up for repairs and alterations.

The United States Navy Yard ordered two oil burner sets of the Erickson type for the two new boats now under construction by them.

The steamer "Fernwood" was drydocked for caulking and recoppering and extensive repairs to the hull under water.

Steamer "Raymond" received a new forged steel thrust shaft.

Santa Fe ferry steamer "San Pablo" was recently at the works for extensive alterations and repairs, at which time a new 500 horsepower boiler was installed, the total cost of the work approximating $20,000.

The Terry Steam Turbine Company of Hartford, Connecticut, report that the business outlook for the coming year is fairly encouraging. The Mountain Ice Company has decided to install a 219 K. V. A. Terry turbo-alternator set in their plant at Gouldsboro, Pennsylvania. This decision was reached on account of the excellent results obtained with a 375 K. V. A. set installed at their new ice harvesting and storage plant at Lake Hopatacong, New Jersey, last year. Manufacturing plants throughout the East and Middle West have been receiving large war orders or else have been feeling the shortage in foreign production and these causes are leading to increased equipment. A firm supplied by the Terry Steam Turbine Company was the Excelsior Needle Company, who are adding a new three-story building to their plant and a 375 K. V. A. Terry turbo-alternator set to their power plant equipment.

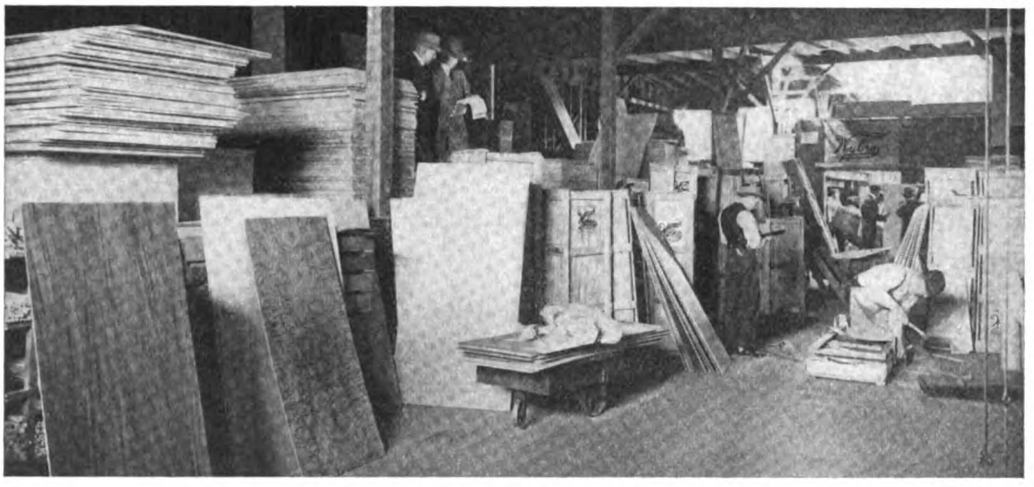
HARDWOODS IN SHIPBUILDING.

Uncle Sam recognizes the importance of hardwoods in the shipbuilding industry. This is shown by the fact that in the present tariff, as well as in previous tariffs for the past 75 years or more, practically all hardwoods were dutiable except those which were imported especially for shipbuilding. The McKinley Act as well as the Payne-Aldrich tariff law specifically eliminates from the payment of duties all hardwoods used exclusively in shipbuilding. Even the present Democratic tariff, while putting most woods on the free list, eliminates the tax in the case of hardwoods which would otherwise pay duty as cabinet woods when such woods are used for shipbuilding purposes.

The well known firm of White Brothers has been dealing in hardwood lumber since the early sixties and during these years has grown up as an integral part of San Francisco. The place of business at present is Fifth and Brannan streets, but for twenty-three years they were at Spear and Howard streets, that is, on the water front.

They have supplied hardwood lumber for the building and repairing of ships since the days of the wind-jammers. We would venture to say that there is hardly a steam schooner or other vessel built on the Pacific Coast and now afloat which does not contain hardwood from this well known firm in some shape, whether Locust Trenails holding the planking onto the frame or a 16x18 Ironbark rudder stock withstanding the pounding seas. In fact, there are a number of kinds and sizes of

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The Veneered Panel Department.

hardwoods which are only carried by White Brothers and their trade in these commodities extends from Cape Nome to Cape Horn.

A year ago White Brothers purchased a tract of Laurel timber in Humboldt County, California, and since that time have placed immense quantities of this most valuable California timber on the market. Many years ago California Laurel was in great demand, in fact, before the advent of Australian Ironbark, Laurel was used almost exclusively for fenders of vessels and other chaffing surfaces. Australian Ironbark came into use about twenty years ago and its cheapness at that time rendered it a formidable competitor of California Laurel and, in fact, practically drove the native wood out of the field. Ironbark and Spotted Gum from Australia, however, have risen steadily in price until now in many cases the prices are well nigh prohibitive and California Laurel has again come into its own. During the past year it has been used extensively for fender stock. One of the most novel uses to which it has been put is bridge planking. Of its wearing qualities, of course, there is no question and its cheapness at the present time renders it valuable for planking in the place of White Cedar or Oregon Pine. One of its recent uses in this connection has been the planking of the Webster-street bridge over the Estuary between Oakland and Alameda. Over 40,000 feet of Laurel planking was laid in this bridge and it makes a very fine showing indeed, and bids fair to outlast ten Cedar or Oregon Pine plankings.

White Brothers at the present time have the largest stock of hardwoods west of Chicago. The variety of their stock is remarkable in that it contains practically every hardwood in commercial use on the Pacific Coast. This stock is drawn from every part of the world. Besides the Oak, Ash, Hickory, Walnut, etc., of our own United States, White Brothers have Boxwood from Turkey, Circassian Walnut from the Levant, Camphorwood from Formosa, Ebony from Madagascar, Genezero and Mahogany from Mexico and Central America, Ironbark, Spotted Gum and Red Bean from Australia, Koa from the Hawaiian Islands, Mahogany from the African West Coast, Padouk or East Indian Mahogany from the Andaman Islands, Japanese Oak from the Northern Island of Hokkiado, Teak from Siam and Burmah, and genuine Rosewood from Brazil with the fragrance of attar of roses still clinging to it. Thus all of the seven seas yield tribute in the way of valuable woods through White Brothers to the varied industries of the Pacific Coast.

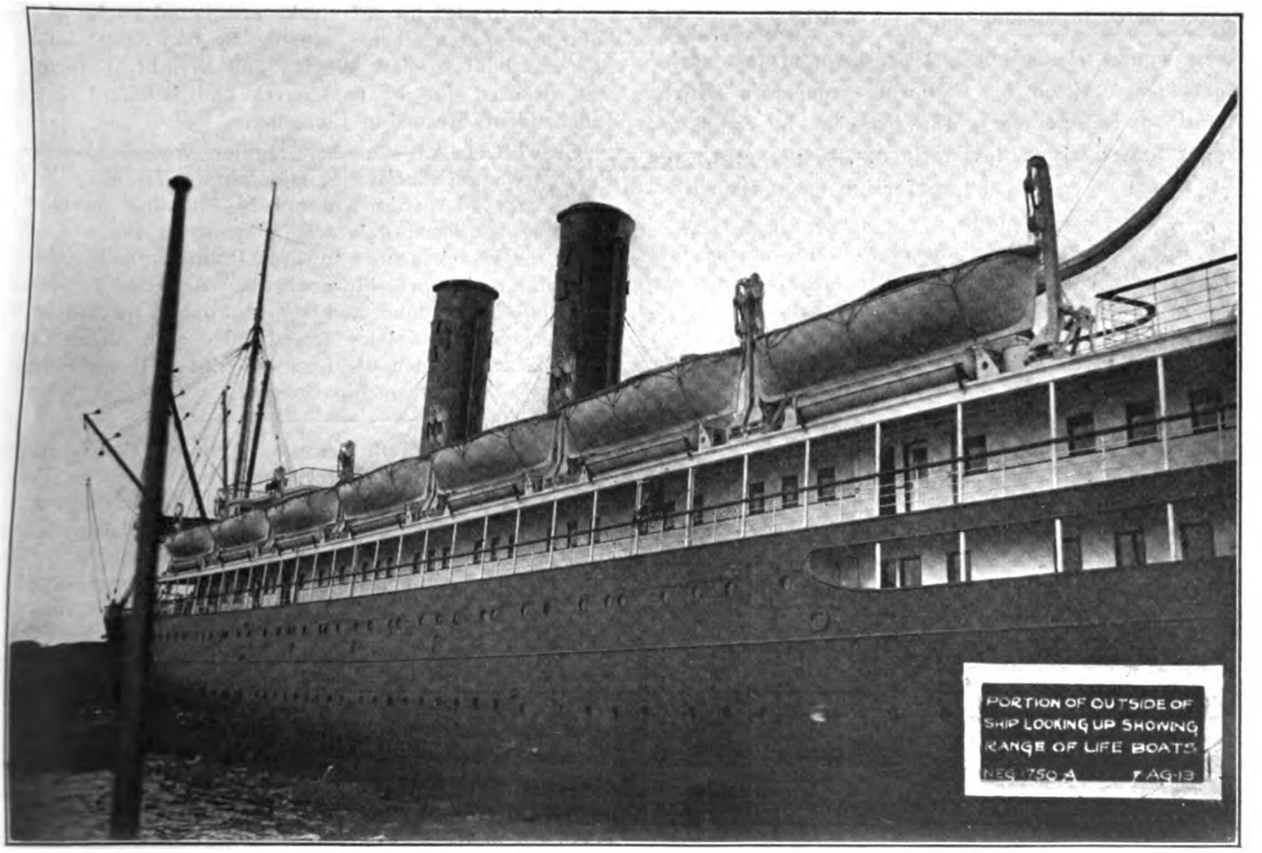


A gangway in the lumber storage house.

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All that was left of the "Hanalei," a pitable wreck on Duxbury reef.



Boat deck of the steamer "Congress" viewed from below.

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Marine Insurance Notes

THE elimination of the "Emden" as a menace to the shipping of the Allies has resulted in a positive lowering of the rates on war insurance on the Indian and African routes. The "Emden's" short raid resulted in the destruction of steamers to the value of roughly $4,600,000, and of cargoes to the value of $4,800,000.

The forty-sixth annual report of the Insurance Commissioner of the State of California shows decidedly that the foreign companies taking marine risks in California were hit hard during the year 1913. The foreign companies collected premiums on that year's business amounting to $1,194,716, and paid losses to the amount of $1,198,455.

The following summary shows the amount of risks written, premiums received, losses paid, and ratio of losses to premiums, comparing business transacted by California companies, companies of other States, companies of foreign countries, and the totals thereof.

	California companies.	Companies of other States.
Amount written	$ 89,220,598	$109,521,987
Premiums received	393,682	876,577
Losses paid	198,926	613,942
Ratio of losses to premiums	50.5	70.0

	Companies of foreign countries.	Totals.
Amount written	$401,629,234	$600,371,909
Premiums received	1,194,716	2,464,976
Losses paid	1,198,455	2,011,324
Ratio of losses to premiums	100.3	81.5

These figures show that 14.9 per cent. of the marine business was written by California companies with a loss ratio of 50.5 per cent.; 18.2 per cent. by companies of other States with a loss ratio of 70.0 per cent.; and 66.9 per cent. by companies of foreign countries with a loss ratio of 100.3 per cent.

The following tabulation shows that during the past thirty years the marine insurance companies have received in premiums $50,930,754.19 and paid out in losses $30,738,977.57:

	Premiums received.	Losses paid.	Ratio of losses to prem'ms.
1884	$ 1,433,138.20	$ 408,410.86	32.7
1885	1,395,993.67	855,630.41	61.3
1886	1,515,279.79	676,325.30	43.8
1887	971,859.86	583,772.27	60.1
1888	1,752,696.58	955,239.49	54.5
1889	1,602,434.12	926,811.88	57.8
1890	1,526,453.95	1,109,431.64	72.7
1891	1,927,088.44	736,735.18	38.2
1892	1,638,876.63	1,059,120.83	64.6
1893	1,354,439.16	808,792.67	59.7
1894	1,113,840.90	418,106.22	37.5
1895	1,249,317.11	887,761.60	71.1
1896	1,418,739.79	819,221.66	57.7
1897	1,689,658.74	1,375,911.66	81.4
1898	1,789,140.56	765,624.90	42.8
1899	1,557,487.19	818,261.22	52.5
1900	1,938,123.83	1,134,047.78	58.5
1901	1,802,525.31	978,308.20	54.3
1902	1,692,599.26	1,074,070.22	63.5
1903	1,511,365.30	1,034,522.92	68.4
1904	1,502,518.52	899,004.65	59.8
9105	1,581,196.83	1,463,939.42	92.5
1906	1,628,982.01	1,394,987.73	85.6
1907	1,885,535.22	1,276,704.91	67.7
1908	1,864,861.07	994,487.39	53.3
1909	1,952,269.99	1,368,892.35	70.1
1910	2,180,135.74	1,689,065.81	77.4
1911	2,321,318.35	1,375,225.59	59.2
1912	2,667,902.00	779,238.00	29.2
1913	2,464,976.07	2,011,324.81	81.5
Totals	$50,930,754.19	$30,738,977.57	

MARINE MISHAPS.

"DIX."—The U. S. Army Transport "Dix," while steaming between Manila and the coaling port of the Mitsui Company at Miike, Japan, ran over a submerged rock. The lower turn of the bilge on the port side was opened up from the after engine room bulkhead to a point abreast of number 4 hatch, a distance of about 75 feet. The tank top was not injured, however, and the vessel made no water. She is being repaired at the Government drydock at Alongapo.

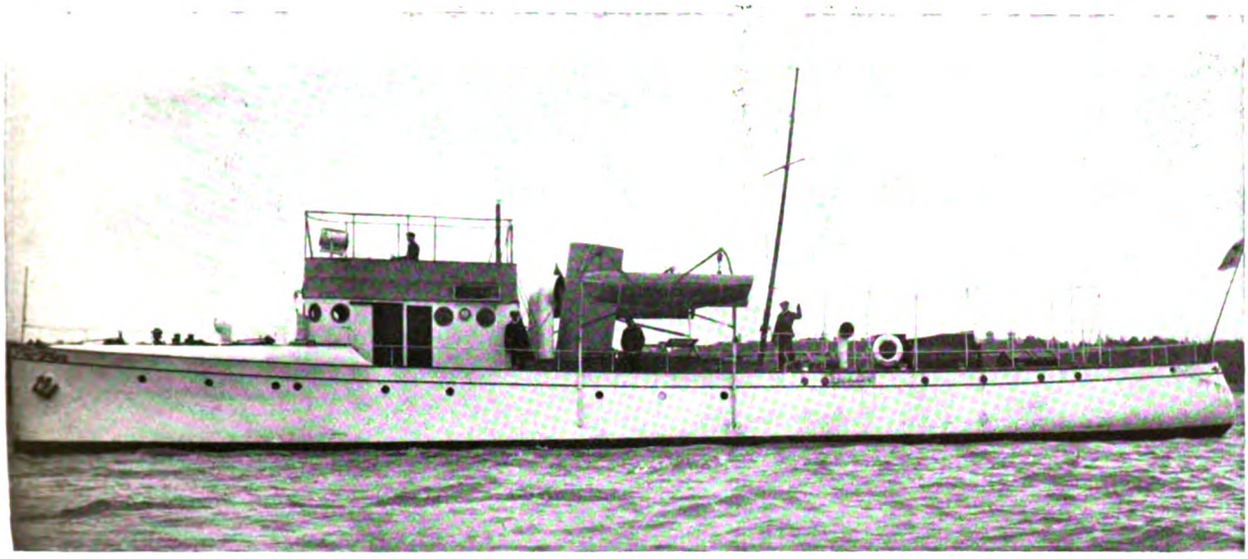
"HANALEI."—This vessel went on Duxbury reef and became a total loss with a heavy loss of life. The cause of this disaster can be safely ascribed to an error of judgment on the part of the captain in shaping his course for the North Channel instead of for the light ship in such questionable weather. She was rapidly pounded to pieces in the breakers and there was practically no salvage. The "Hanalei" was of 666 gross and 502 net tonnage. She was 174' 6" long, 36' 0" beam and 13' 0" molded depth. Her draft with 700,000 board feet of lumber aboard was 19' 0". Her machinery consisted of 16"-34" by 27" stroke compound engine of 550 horsepower, steam being supplied by two Scotch boilers. She was built in 1901 by Hay and Wright at Alameda, was licensed for 76 passengers and belonged to the Independent Steamship Company.

"CENTRALIA."—On her regular voyage from San Pedro to San Francisco at midnight on December 10, a boiler tube blew out temporarily disabling the boiler. A heavy southeast gale was blowing at the time and drove the vessel inshore towards Point Arguello. About five miles off shore, however, she succeeded in finding good holding ground and lay at anchor till assistance arrived. She was later towed into port. The "Centralia" is a wooden steamer built in 1902 and owned by the Pollard Steamship Company.

Our cover design this month represents the departure of a part of the armored cruiser flotilla from San Francisco Bay. The ship in the foreground is the former "California," now rechristened the "San Diego," and the following ship in line is the "South Dakota." The photograph was taken by Walter Scott, commercial photographer, of 558 Market street, San Francisco.

The Japanese Government is rushing the work on ten destroyers which are expected to take part in the present war. The general particulars of the new vessels are approximately as follows: Length over all, 274 feet; length between perpendiculars, 260 feet; extreme breadth, 24 feet; molded depth, 15 feet 3 inches; draft, 7 feet 4 inches; displacement, 605 tons; horsepower, 9500, and speed, 30 knots. They will be armed with one 4.7-inch gun in a shield, four 3-inch guns and four torpedo tubes.

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Patrol boat of Grand Duke Boris of Russia.

CARGO EX "MIRAMICHI."

Important Decision of Sir Samuel Evans, President of the Prize Court, London.

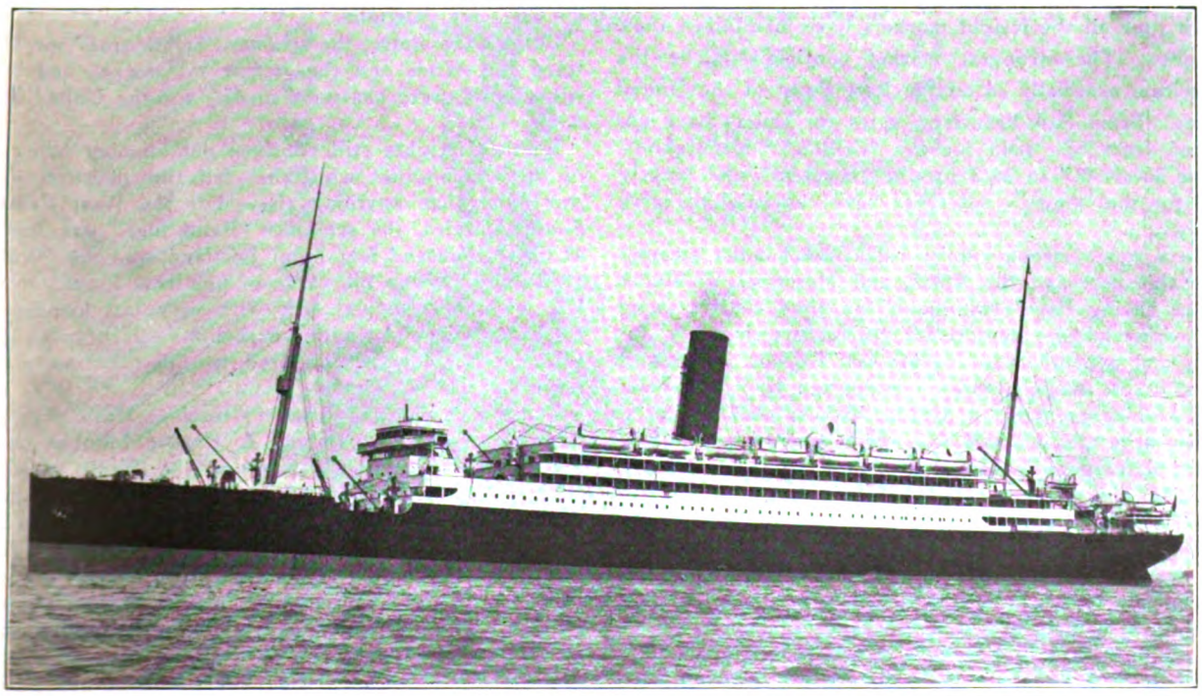
In the month of July, before the war and without any anticipation of war, grain was shipped on the "Miramichi," a British steamer from Galveston for Rotterdam by American shippers, sold cost, freight and insurance to two German firms, one at Colmar, the other at Mannheim.

On war breaking out, owners of steamer ordered her to Queenstown and by instructions of British Admiralty the vessel was sent to Eastham, near Manchester, where on September 1 it was seized and claimed by the Crown as prize. The Crown claimed that the cargo was at the risk of the German buyers, whereas the claimants, the American shippers, contended it was still their property and could not be lawfully seized.

The Court held that in a case like this, where goods were sold and shipped during peace, without any anticipation of imminent war, and are seized or captured after war has supervened, the cardinal principle is that they are not subject to seizure or capture unless under the contract the property in the goods has passed to the enemy.

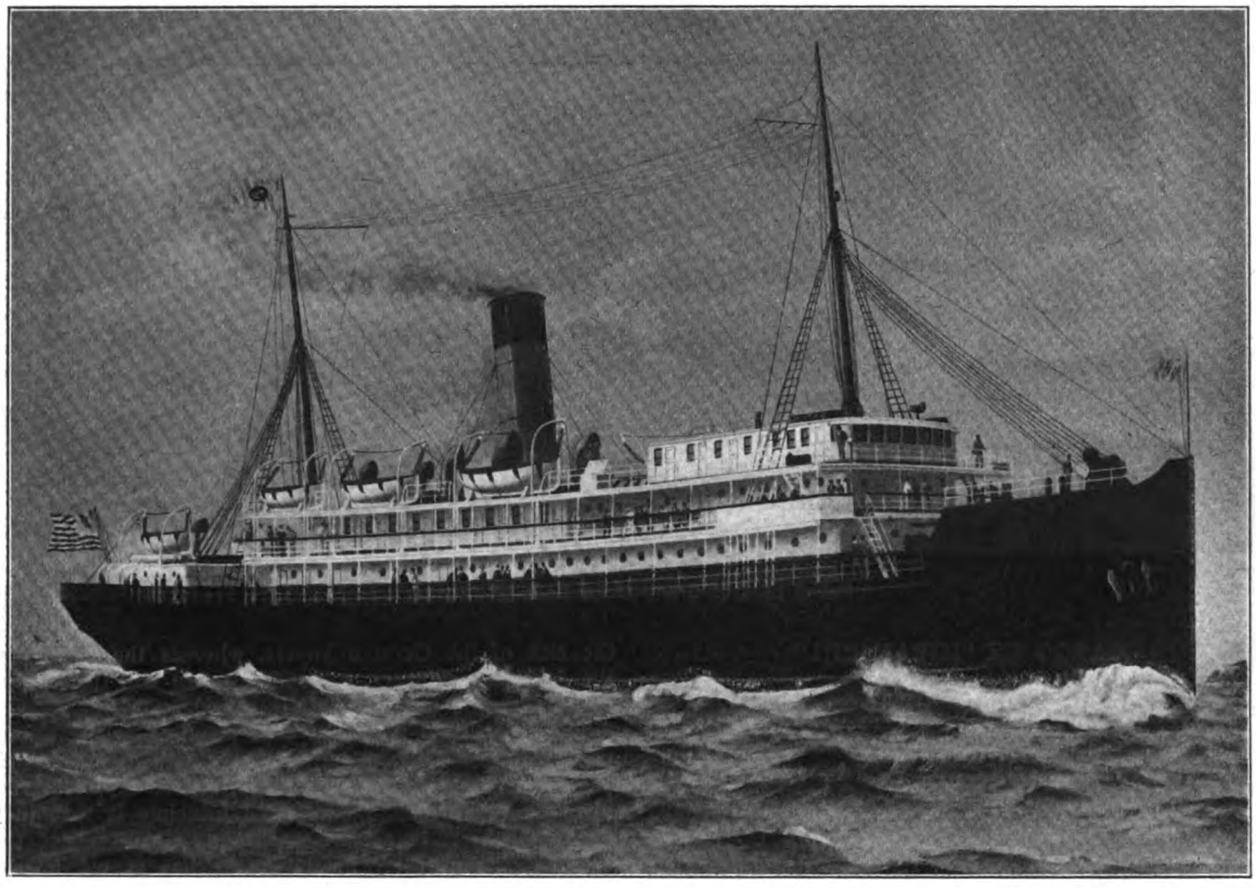
The main determining factor is whether according to the intention of the buyer and seller, the property has passed.

In this case the Court held that the goods remained the property of the sellers until the shipping documents had been tendered to and taken over by the buyers, and the Bill of Exchange for the price had been paid. The Crown was given leave to appeal.



The type of English South American liner that will once more resume regular schedules following the elimination of the German commerce destroyers.

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How the "Admiral Watson" will look when she resumes her run after extensive alterations in her upperworks.

Freights and Fixtures

By PAGE BROTHERS.

San Francisco, December 15, 1914.

Our last review was dated the 21st of November, since which time all the freight markets have maintained their firmness. The strongest market continues to be the American, especially so on the East Coast of the United States. From San Francisco, rates for sailers have advanced from 35/- paid for the "Crillon," "MacMahon," "Rene Kerviler," to 36/3 for the "Inveresk" and latterly 37/6 for the "Aggi." All these have chartered to carry barley.

There was a strong inquiry for a merchandise steamer from this port and the North, and Messrs. J. J. Moore & Co. having the "Strathblane" on time charter could not withstand the temptation of rechartering her for grain and general cargo to Messrs. Balfour, Guthrie & Co. at a rate, namely, 45/- on grain, and 47/6 on general cargo, which promises to be the highest paid this year, to discharge at Liverpool or London, and 1/- per ton on the whole cargo additional if discharged at the two ports.

Besides this steamer, Messrs. Girvin & Eyre chartered the "Cairnhill" at 42/6 a few days ago, followed by Messrs. Balfour, Guthrie & Co. paying the same rate for the steamer "Devon City," which shows a slight decline.

From the North, which has in profusion what we have nothing of, namely, wheat, there has been lively chartering ranging on sailing vessels from 31/3 by steady advance to 37/6, about sixteen sailing vessels having been taken, amongst which was the "Birkdale," a very handy little sailer, on the spot, for which Kerr, Gifford & Co. paid 42/6 for United Kingdom, option of 37/6 for Africa and 35/- for Australia.

Besides the above, the steamer "Strathlorne" was chartered for Africa and the steamers "Onwen" and "Penrith Castle" were chartered at 45/- for the United Kingdom.

Lumber freights still continue dull, lumber being one of the commodities which has felt the influence of the war more than anything else. For the West Coast of South America, the schooner "Bainbridge" was fixed at 47/6 per thousand feet, from Portland, and the "William H. Talbot," with a full cargo of ties from Eureka to Callao, we understand, at 42/6 with very fast loading and discharge. The American barkentine "Henry K. Hall" was the only vessel chartered to Australia, on private terms by Balfour, Guthrie & Co.

For the Orient, the steamer "Kenkon Maru" has been taken by the China Import & Export Lumber Co. at about 4/- for one round trip, and the "Senju Maru" at slightly lower rate also for one round trip from and to Japan. The Pacific Export Lumber Co. have just fixed the steamer "Shintsu Maru" on time charter, private terms, to carry a full cargo of creosoted ties to India from the North. Nothing has been done for Africa or for the United Kingdom. We look for freights to be maintained as long as the war lasts.

Yours truly,

PAGE BROTHERS.

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CRAIG SHIPBUILDING COMPANY.

The following report of work at the Craig Shipbuilding Company for the year 1914 was received too late to go in with the returns of other yards. During the year the following tonnage was delivered:

The "Alvarado," yard number 118, of 1319 gross tons, 9 knots speed, twin screw, reciprocating quadruple expansion engines of 900 horse power. This vessel was constructed for the bulk oil or lumber trade and was delivered to her owners, the Pacific Transport Company.

Yard number 120 represents the "J. E. Upson," a 20" steel suction dredge built to the order of the Los Angeles Dredging Company.

Numbers 121 and 122 are Government submarines designated as L-6 and L-7 and were 48 and 49 per cent. complete respectively on December 1st. These craft will be driven by Busch-Sulzer Diesels of 1220 combined horse power. The cost of these submarines complete is $560,000.

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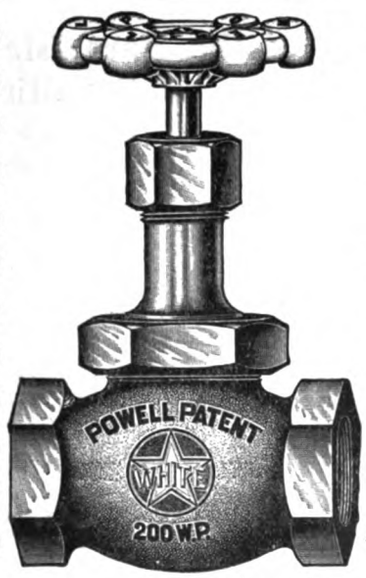
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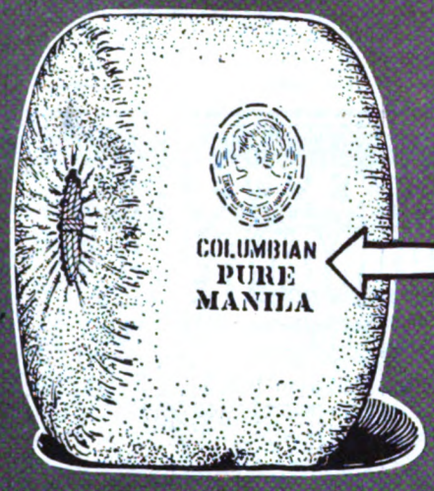
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PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE.

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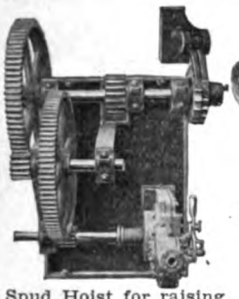
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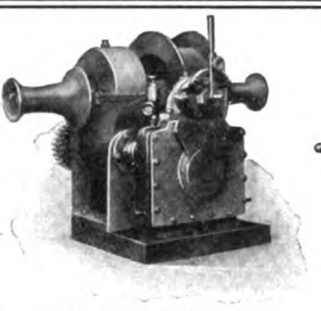
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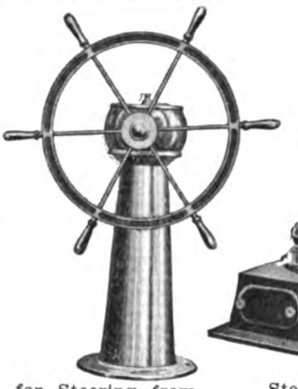
Single Wheel Steam Steering Gear



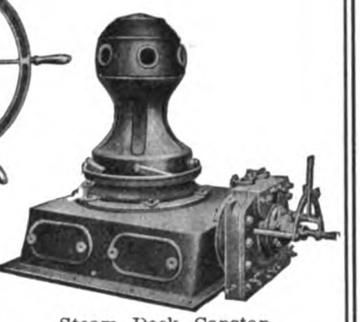
Spud Hoist for raising and lowering spuds on dredges



Gang Plank Hoist

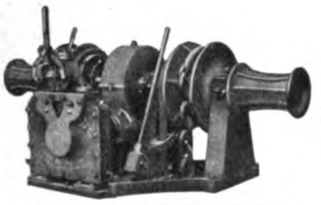


Standard for Steering from top of Pilot House

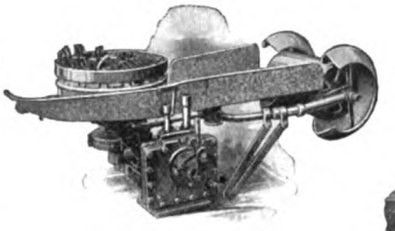


Steam Deck Capstan

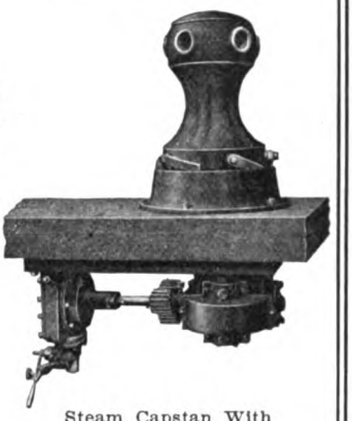




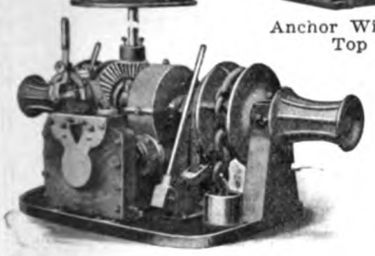
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Steam Capstan With Engine under deck



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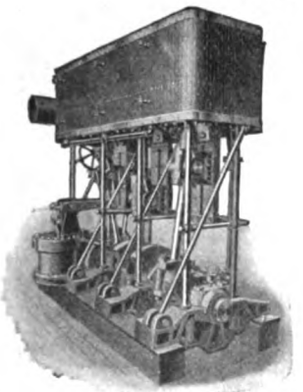
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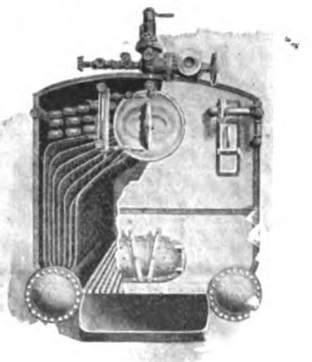
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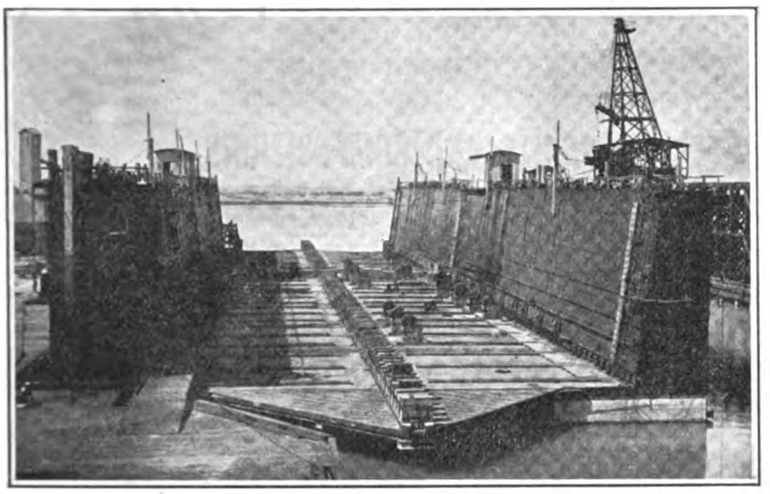
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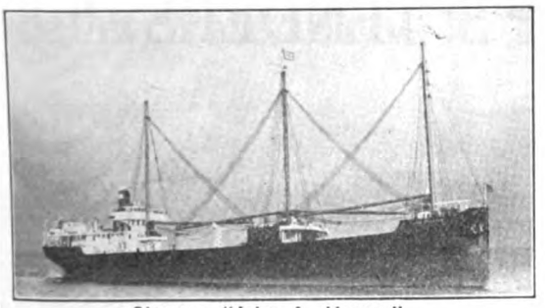
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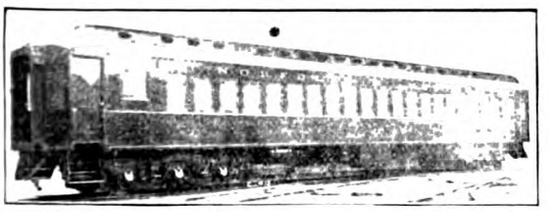
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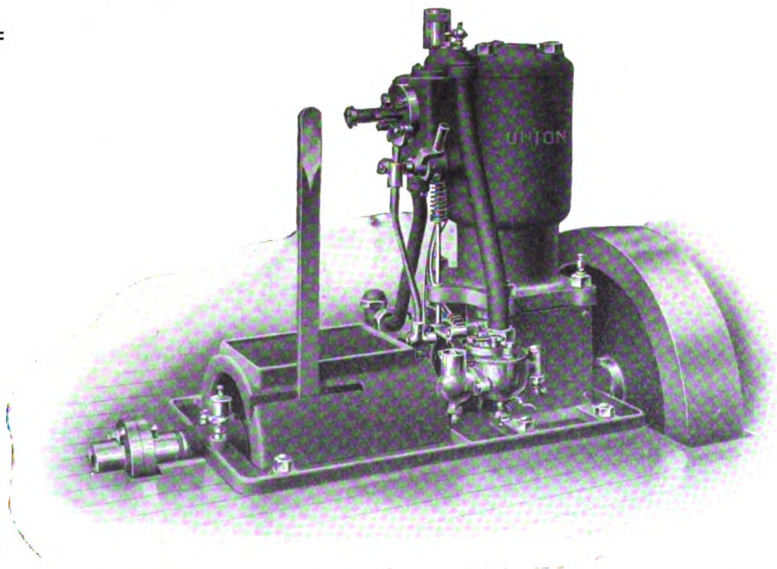
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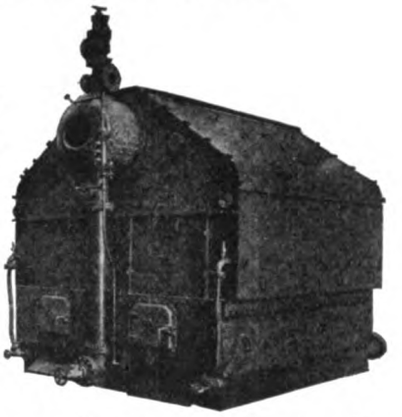
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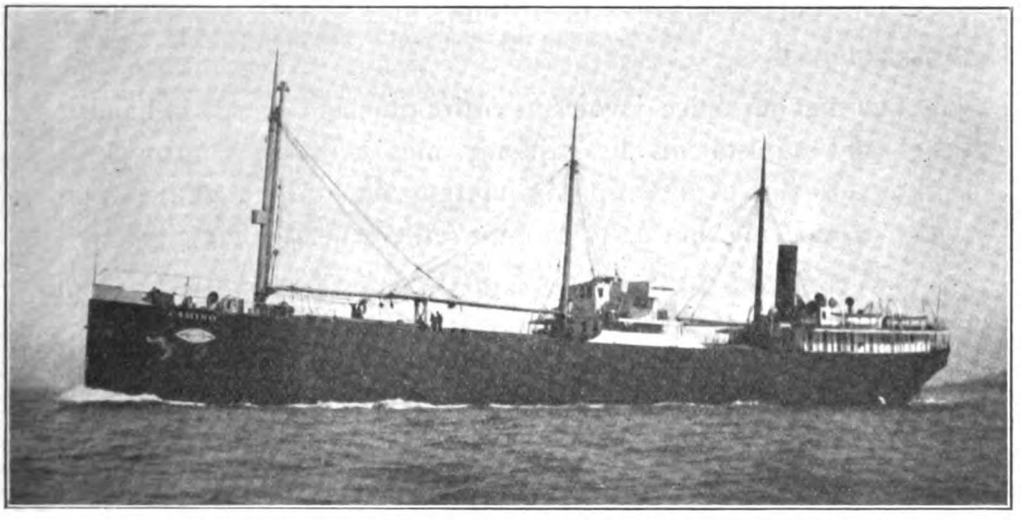
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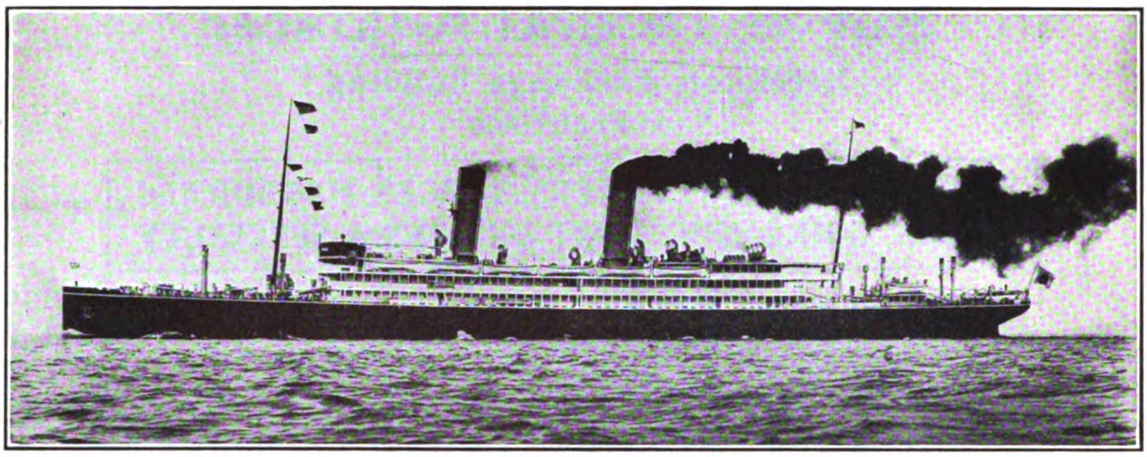
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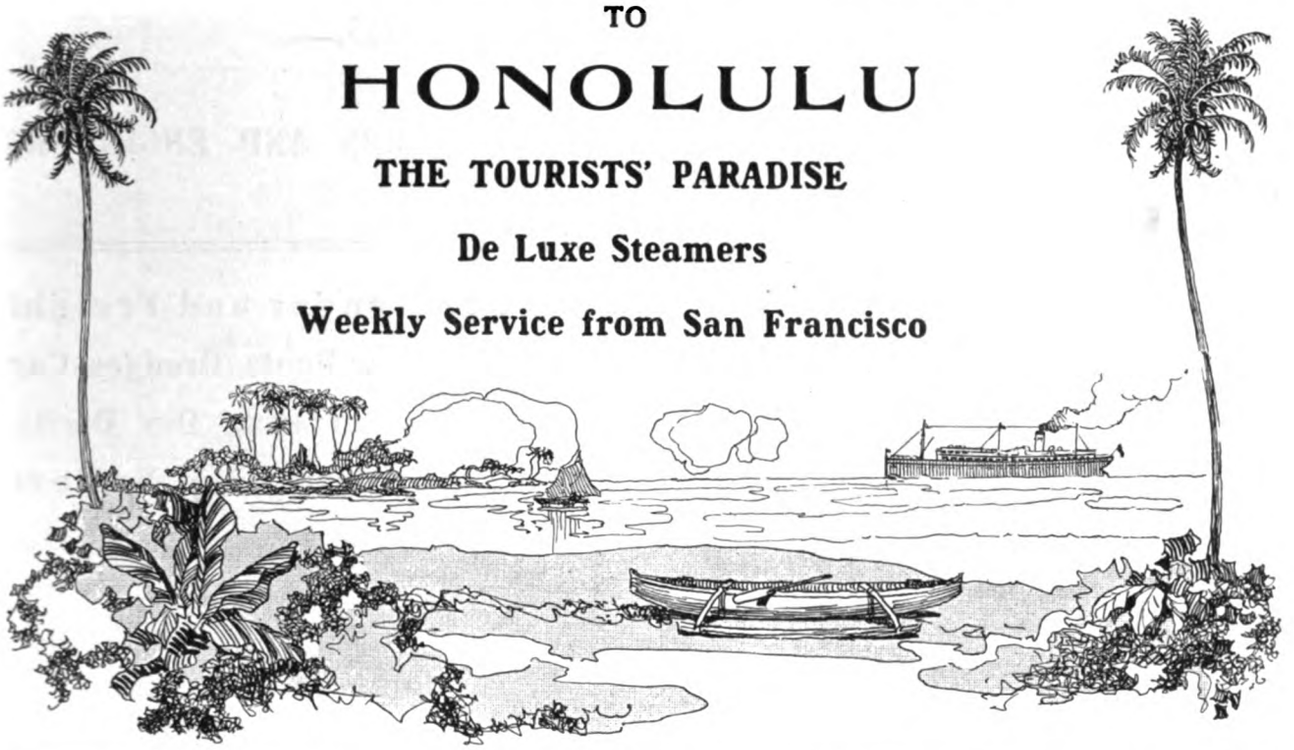
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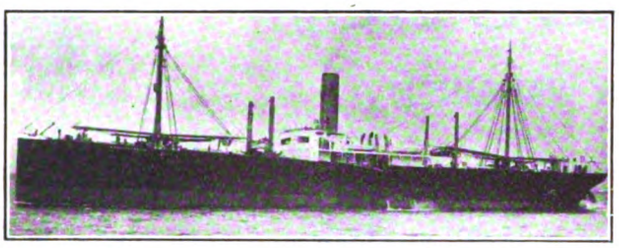
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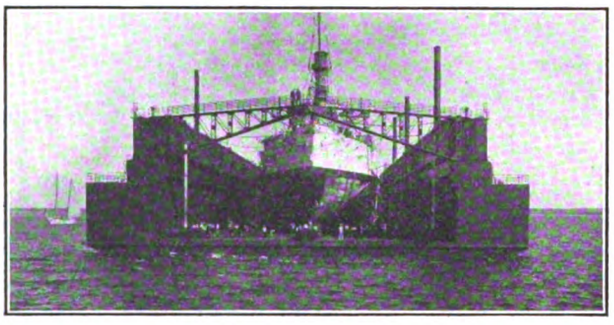
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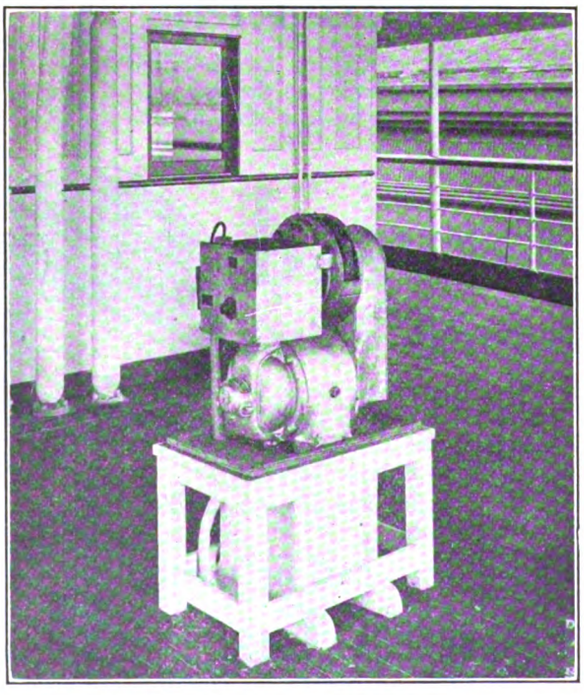
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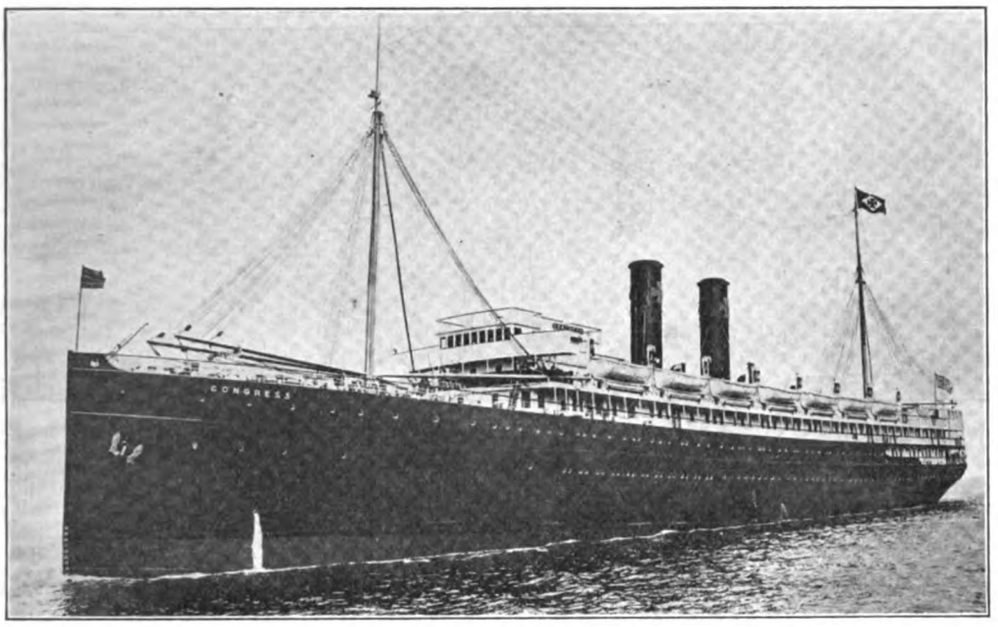
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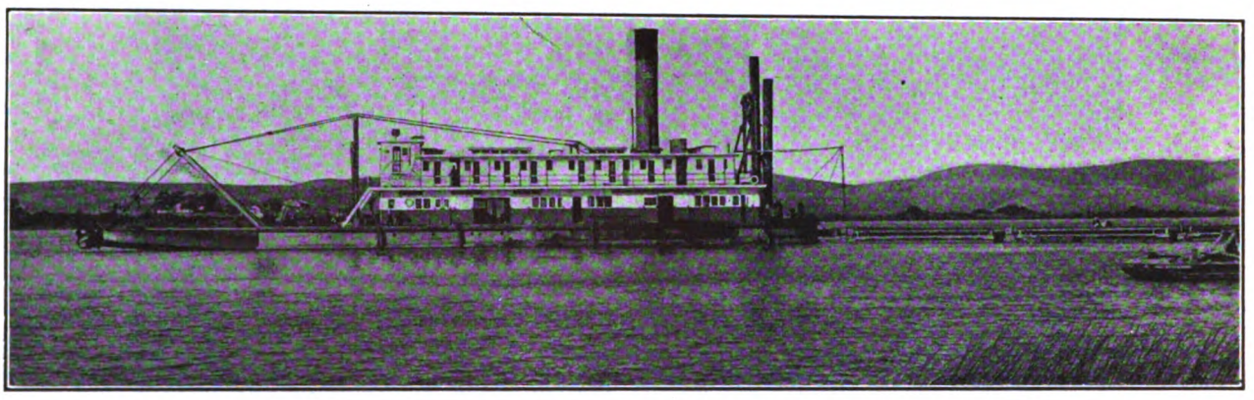
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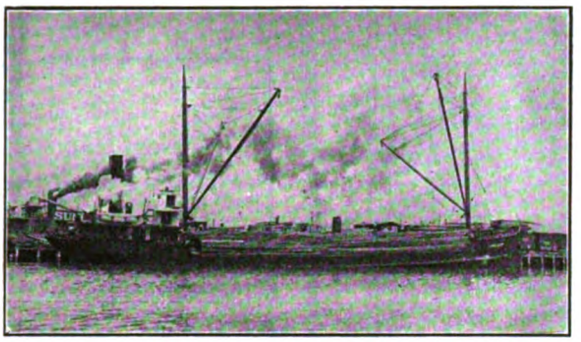
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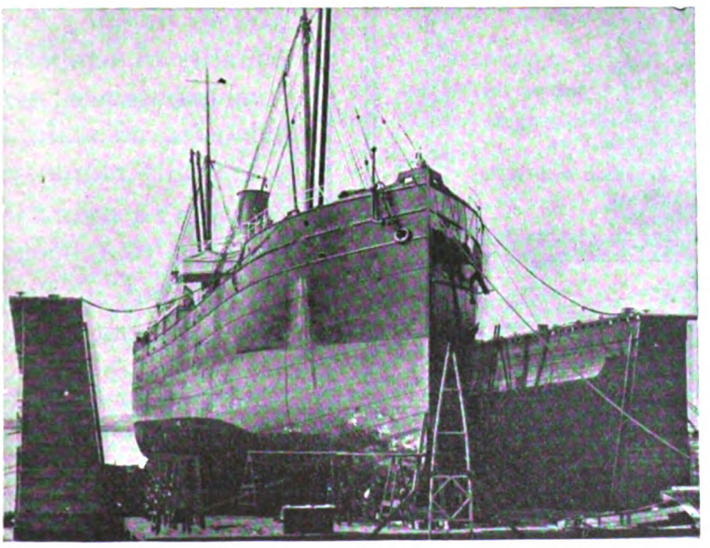
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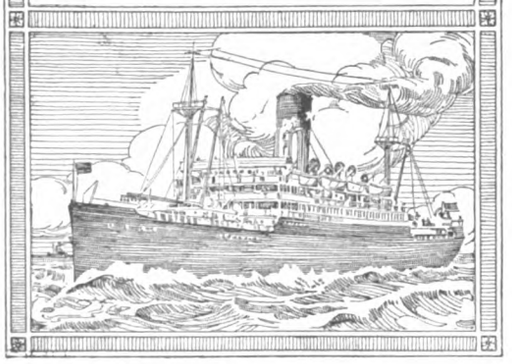
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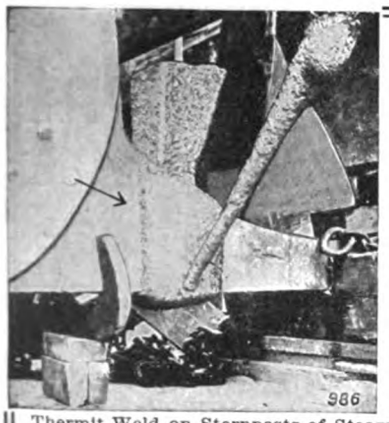
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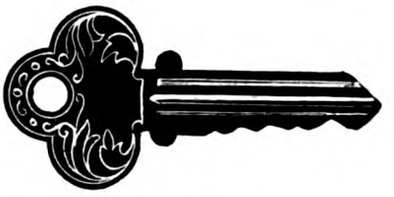
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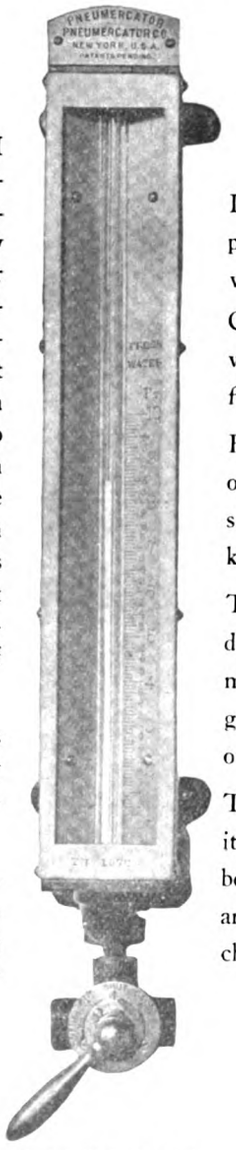
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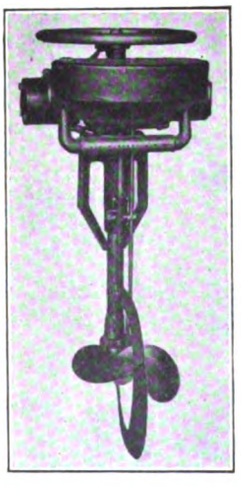
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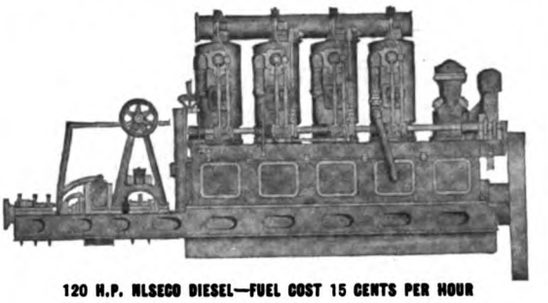
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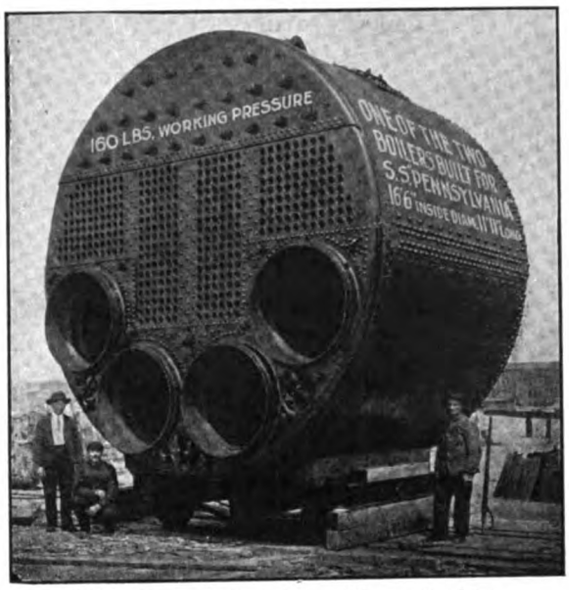
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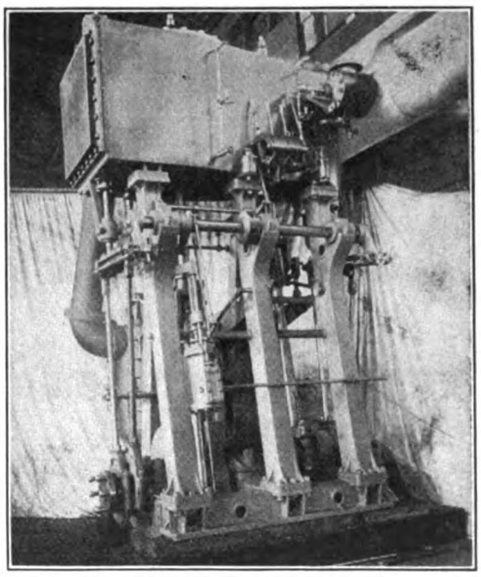
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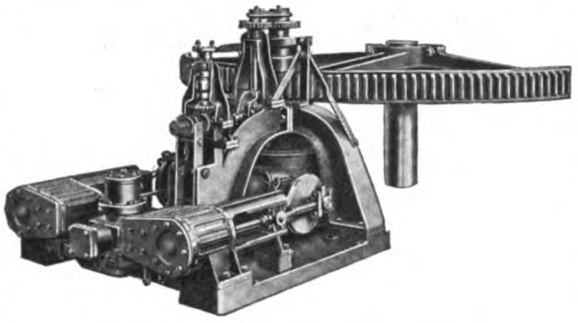
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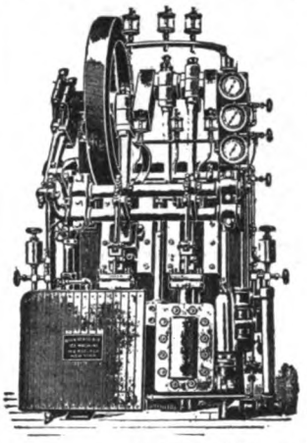
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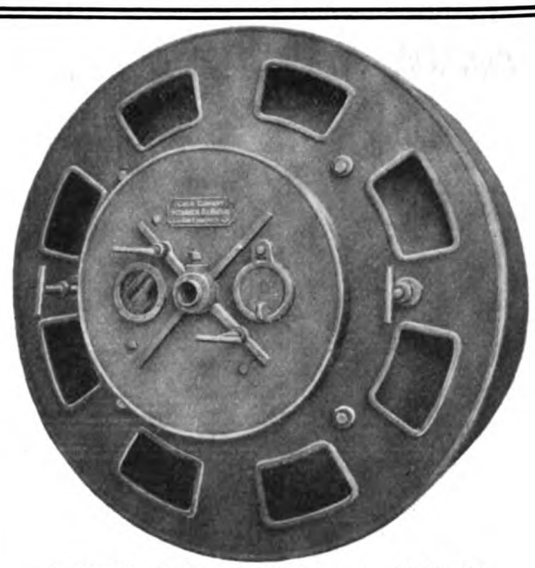
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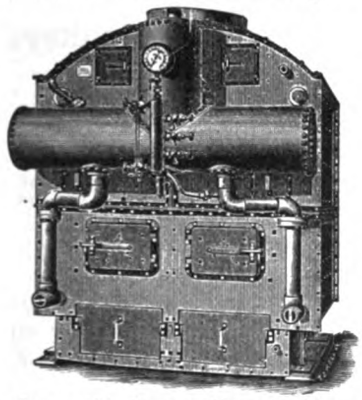
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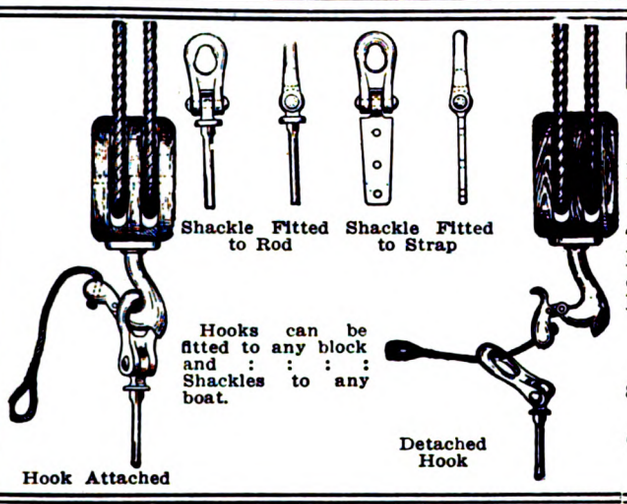
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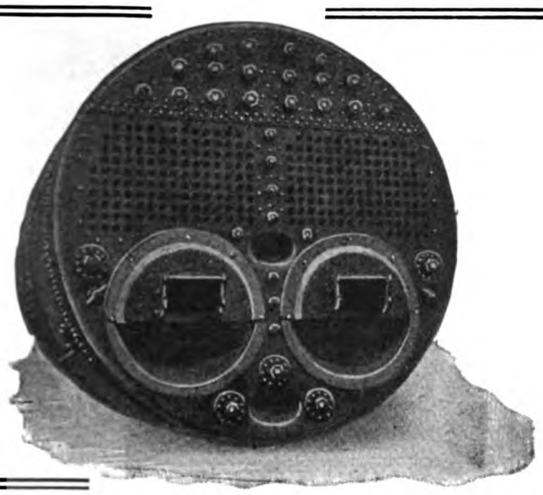
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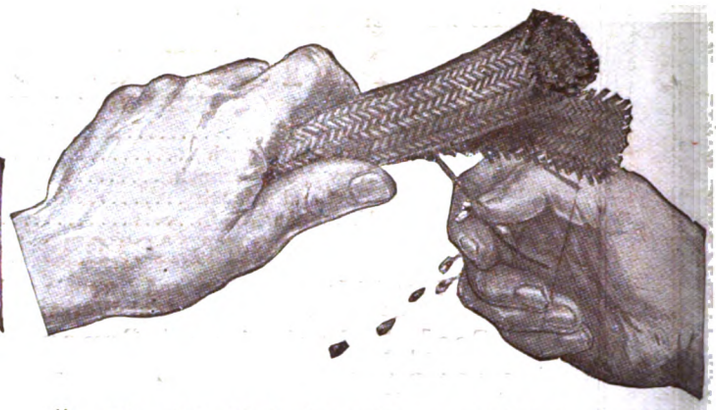
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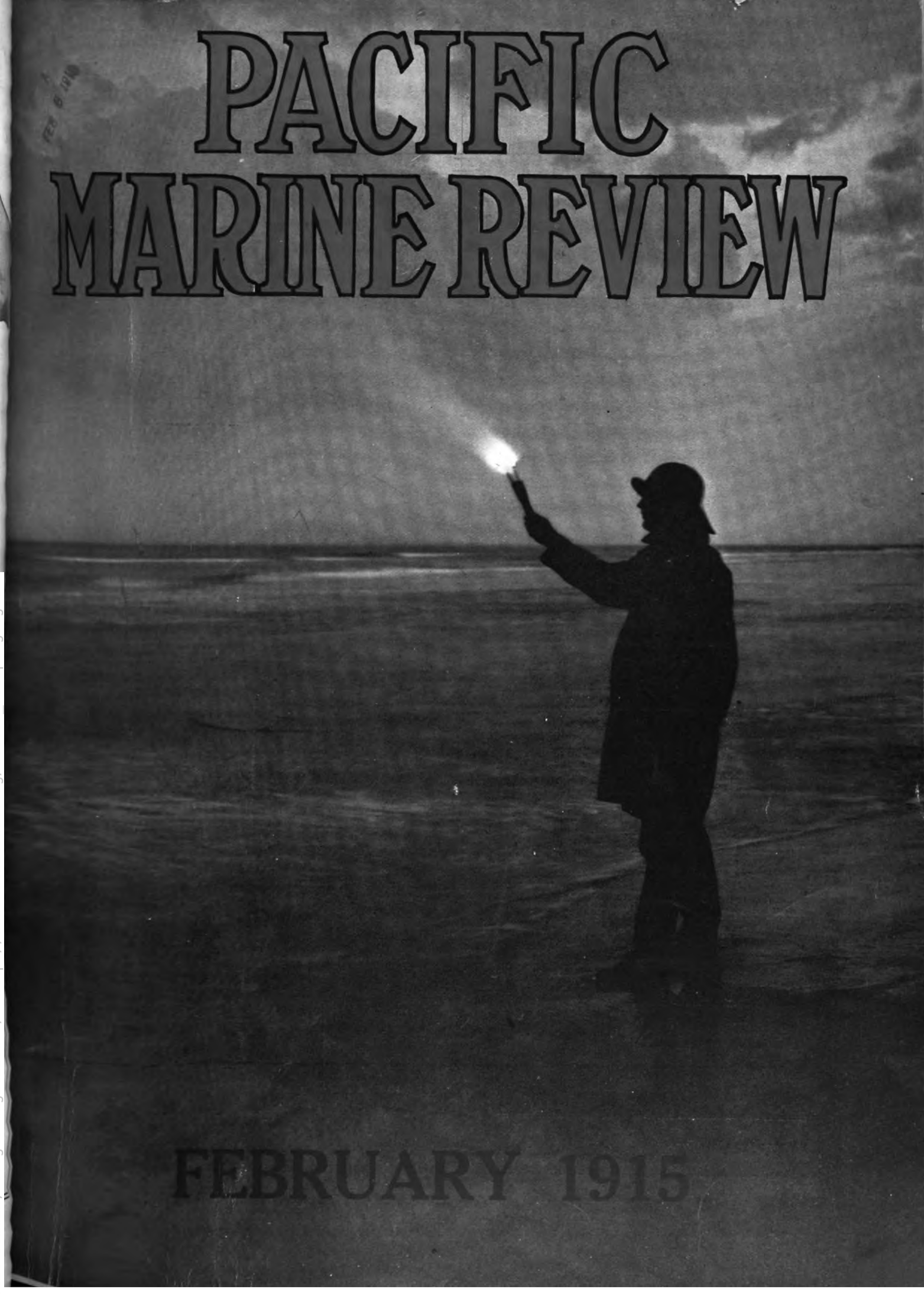
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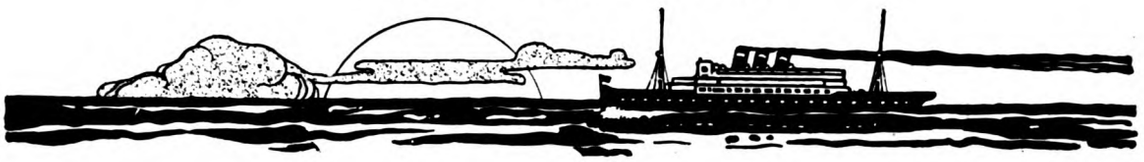
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PACIFIC MARINE REVIEW



FEBRUARY 1915

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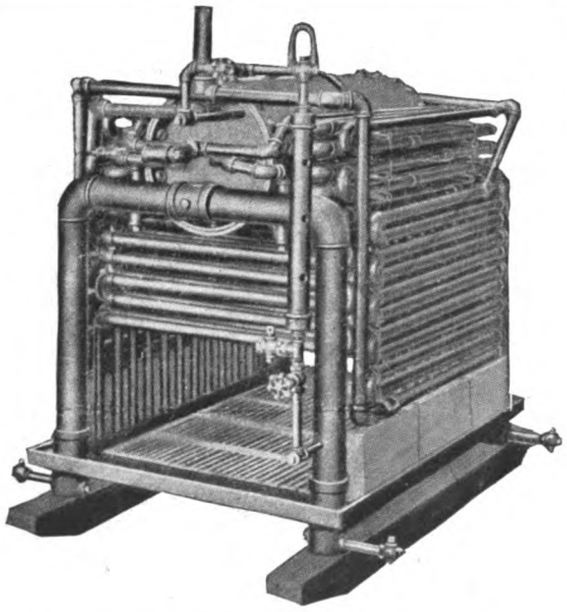
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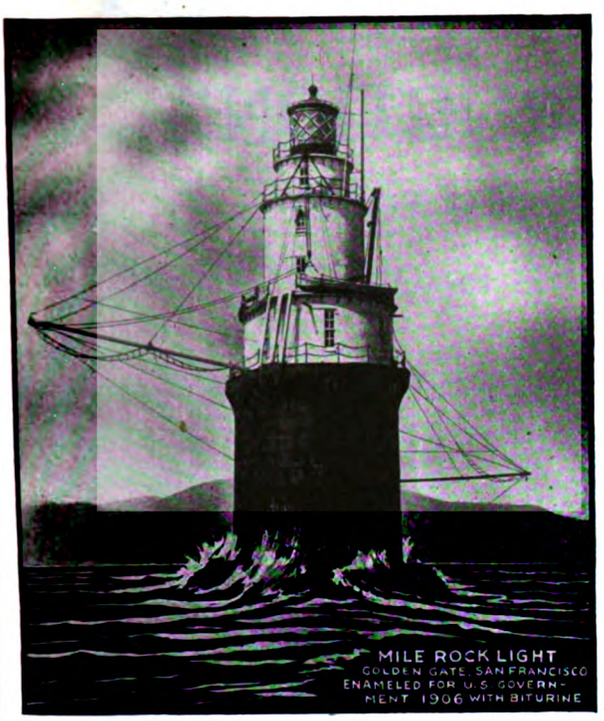
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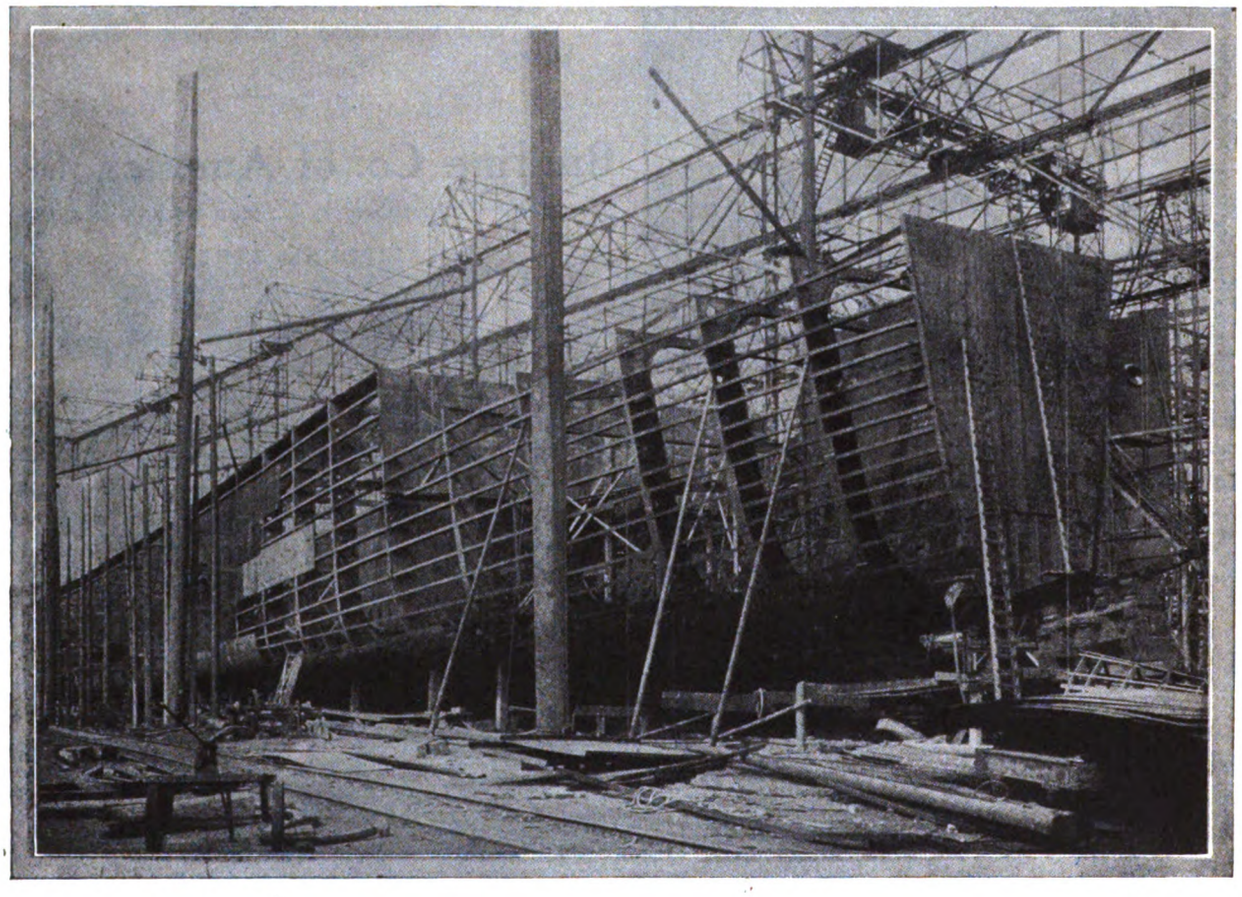


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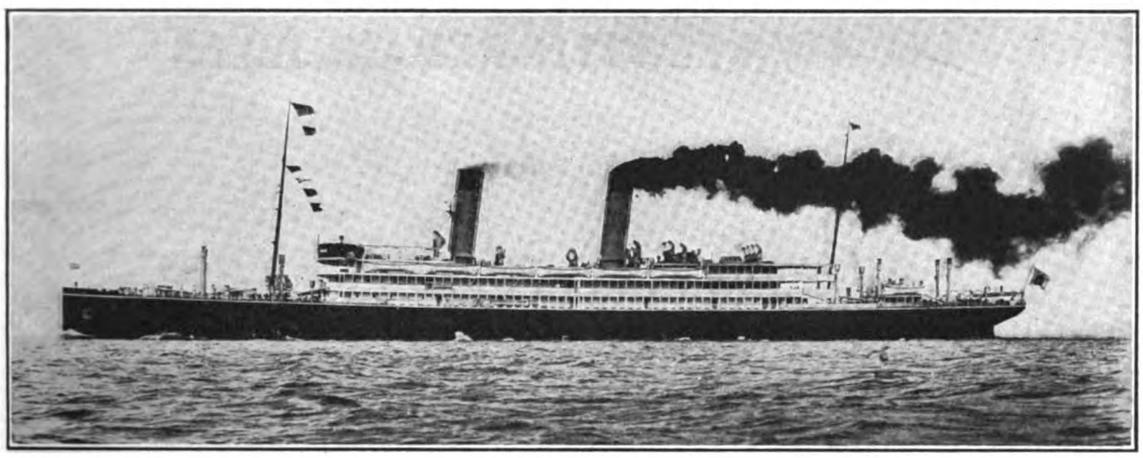
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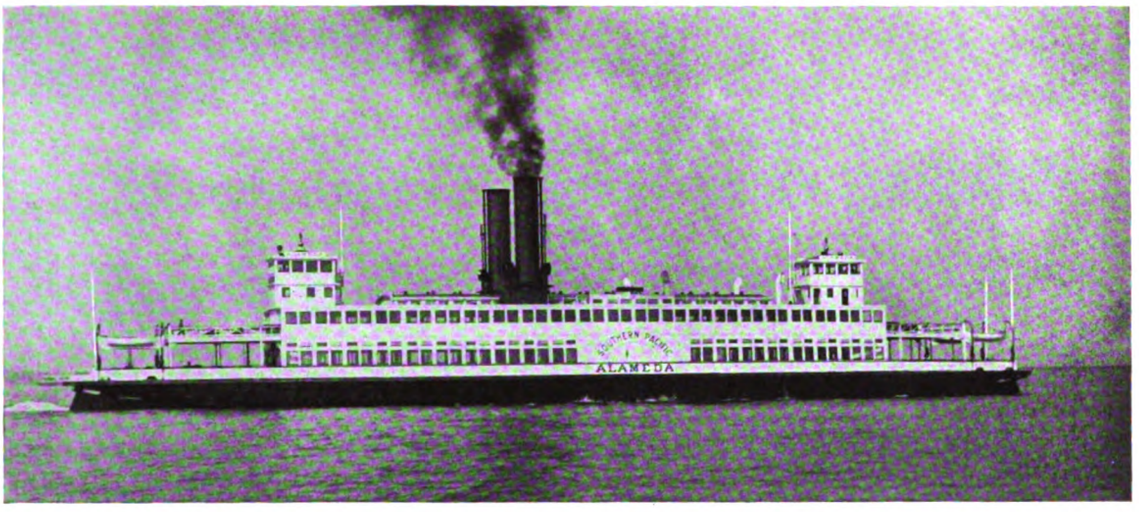
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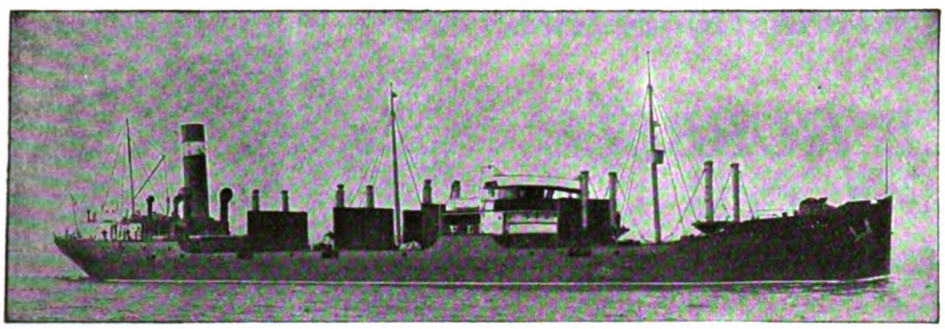
CHAS. C. MOORE,
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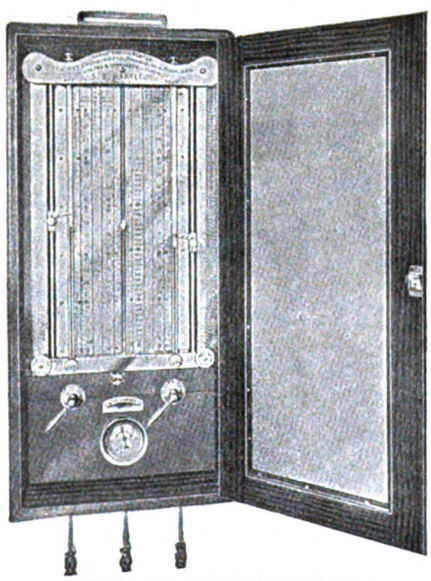
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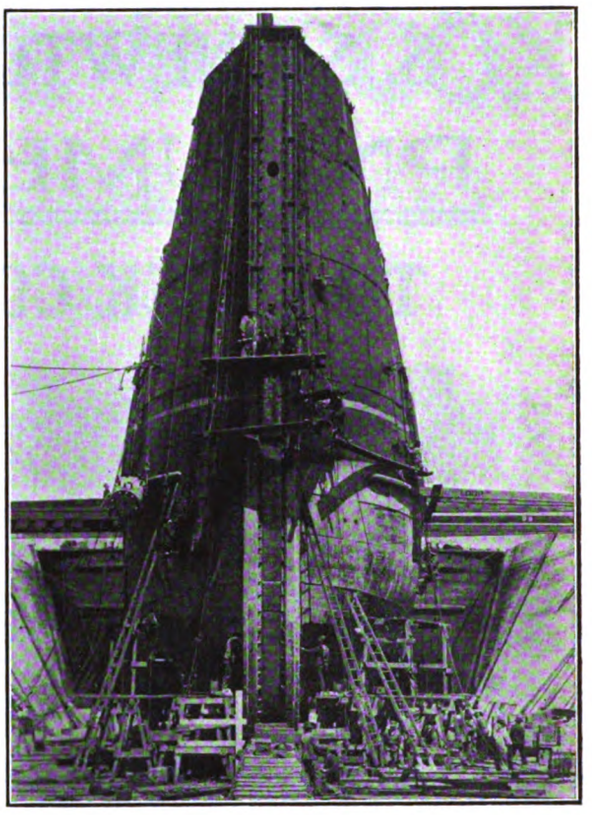
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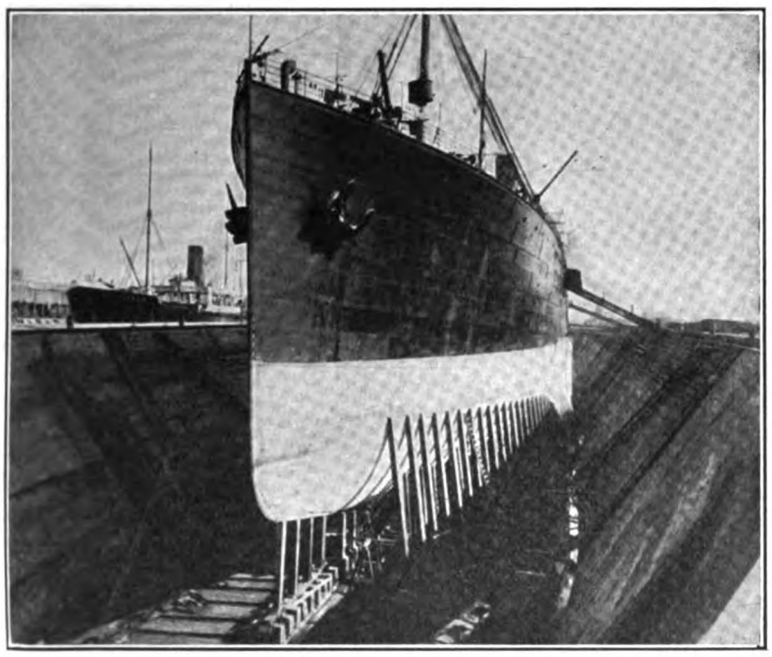
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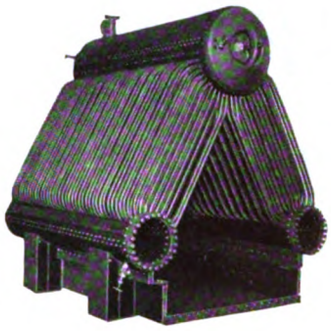
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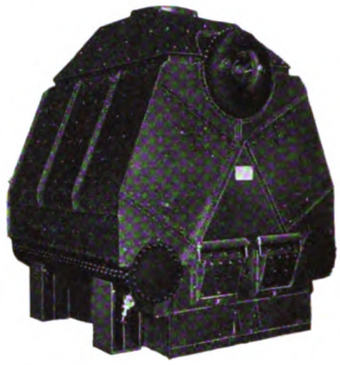
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SCOTT PATENT WATER TUBE BOILER



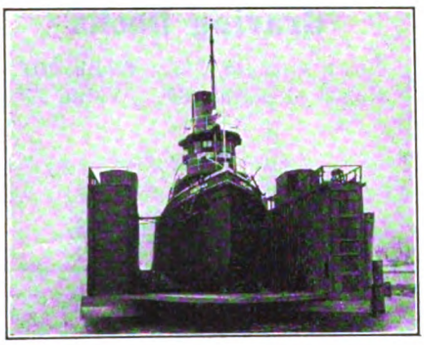
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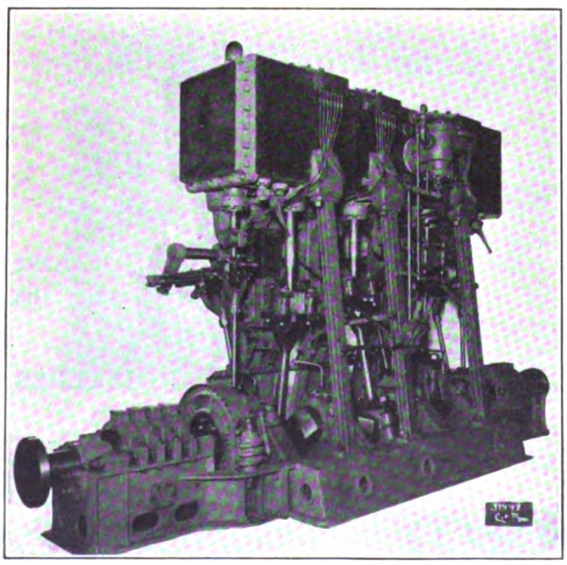
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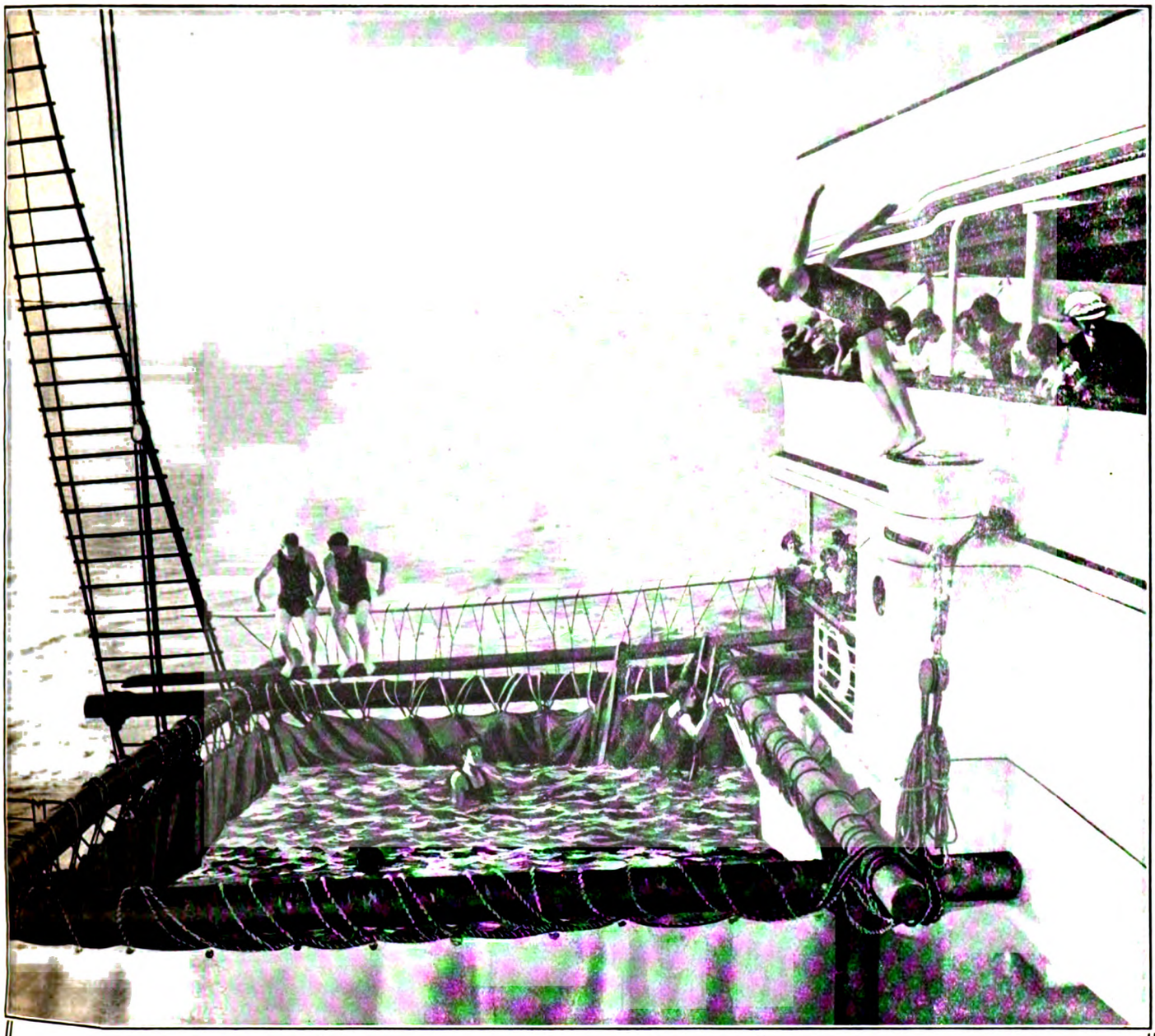
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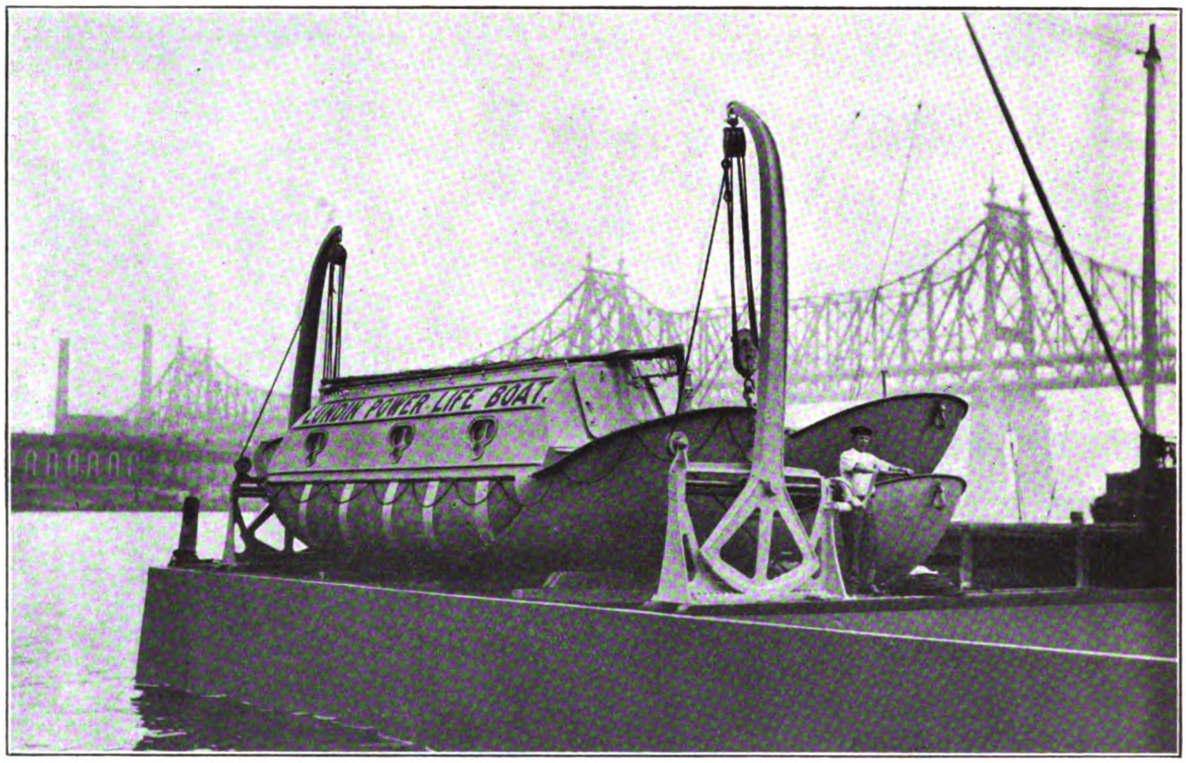
R. P. Schwerin, Vice-Pres. and Gen. Mgr. H. N. Thomas, Actg. G. P. A.

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PACIFIC MARINE REVIEW

OFFICIAL ORGAN OF THE SHIPOWNERS' ASSOCIATION OF THE PACIFIC COAST.

VOL. XII. No. 2. SAN FRANCISCO FEBRUARY, 1915.

The School Ship

By PAUL C. FILLY

TO ALL who love the stars and stripes, the American School Ship is an inspiring thought and, as an institution, it is as essential to our national development as any part of our educational system. Our school ships enhance the material wealth of the nation in proportion to the wisdom of their management. If the United States is destined to occupy a commanding position in the maritime world she must have officers for her ships and these officers should be the product of properly equipped school ships. How best to train these future officers should engage the serious consideration of our Government. The methods of the past are a useless waste of time and money.

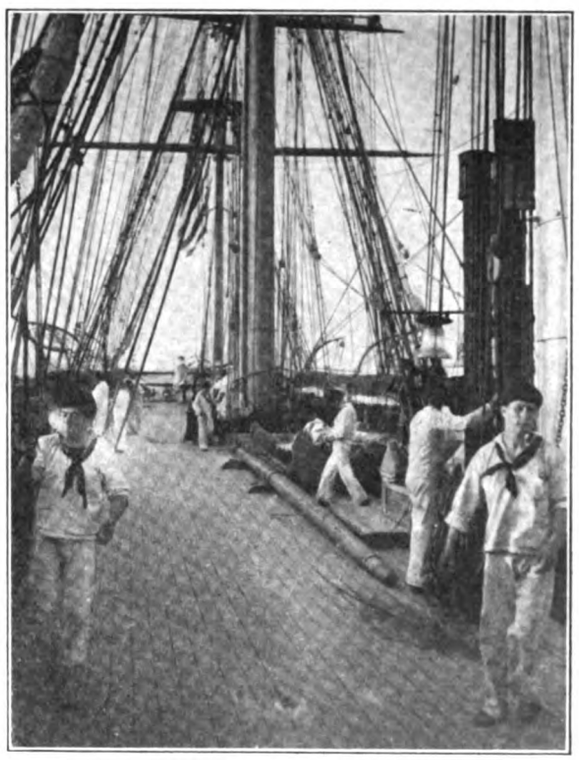
Thirty-four years ago the writer graduated from his Alma Mater and is second to none in loyalty to the old school ship. The friendships he then formed are still among the most cherished and the songs we sang still linger in memory. Perhaps some reader may have heard these lines which, for over a third of a century, resounded on the old "St. Marys" as class succeeded class and boys came and went from shore to ship life:

"If any of you young men
Want to go to sea,
Pay your thirty-five,
And go on the 'St. Marie';
With tarpaulin hat,
And baggy suit o' blue,
You may shinny aloft
As daddy used to do."

Those were the days of hemp rigging, dead eyes, fish booms, single topsails and bunt-jiggers, now it is steel and steam, wireless and highly developed machinery but as great as ever is the demand for efficiency and economy in handling both ships and their equally valuable freight.

There is no nation in Europe but has more than one school ship. Even Belgium has two which are larger than any in the United States. The year of the Centennial celebration at Philadelphia (1876) will ever be memorable to New York for it was then that the old "St. Mary's" appeared upon the waters of the Hudson and the Schuylkill rivers dedicated to a new calling. Surely the occasion was auspicious. New York began her school ship system with the old sloop of war, "St. Mary's." This historic craft was followed by the "Newport," a gun-boat with steam power which in turn is to be replaced in the near future with the famous old "Hartford."

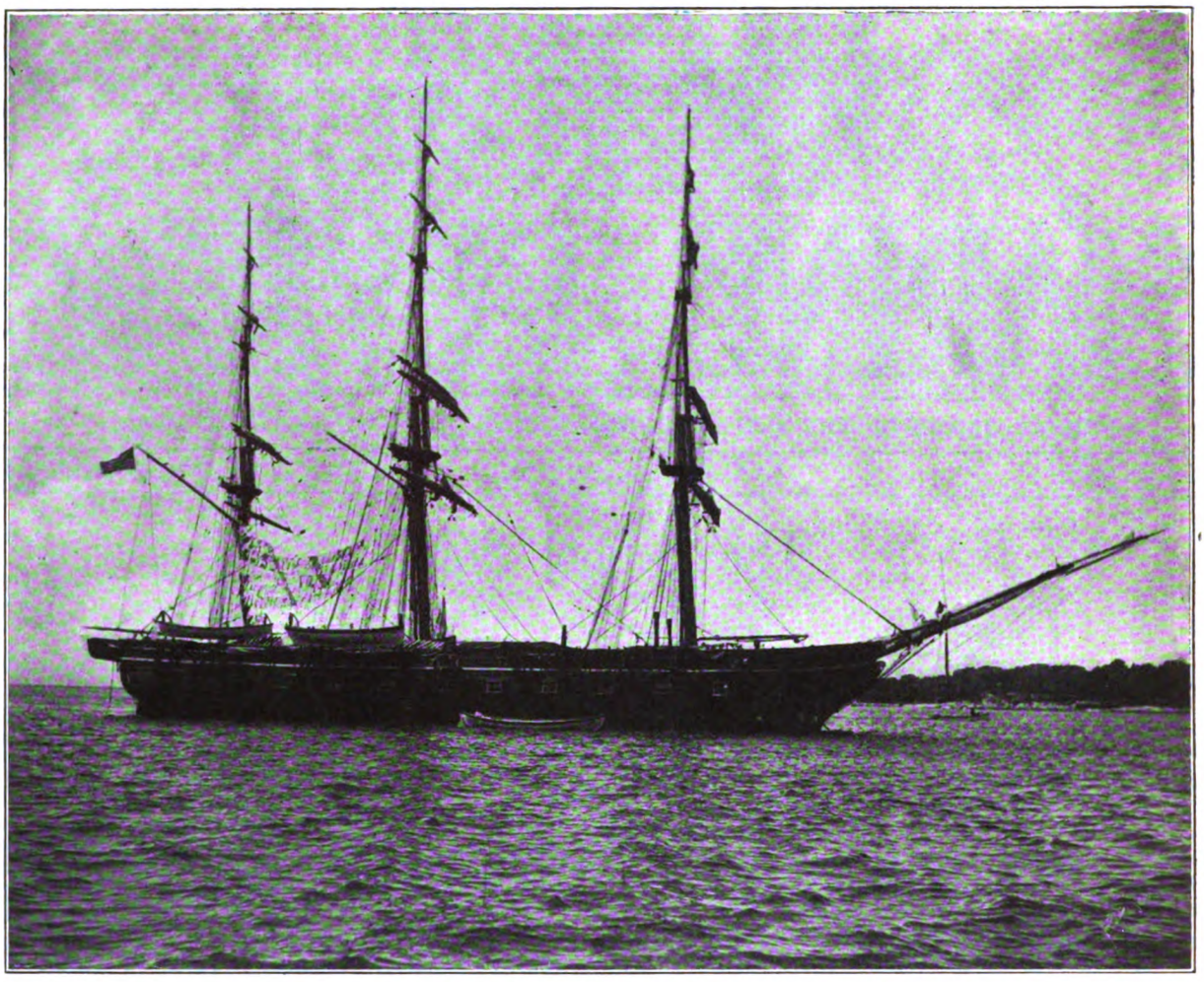
As the school ship under proper management becomes a great factor in the development of character in youths



Fine weather at anchor.

at the most plastic period of life, the greatest care should be exercised in the selection of its officers. We all know the difficulty of picking a faculty for an ordinary public school even when there is so much available material at hand, but with the ship we have a technical school with the most exacting requirements. Teaching to some educators is a great and noble calling, while to others it is a mere pastime, a means for self indulgence. The school ship to fulfill its mission must be

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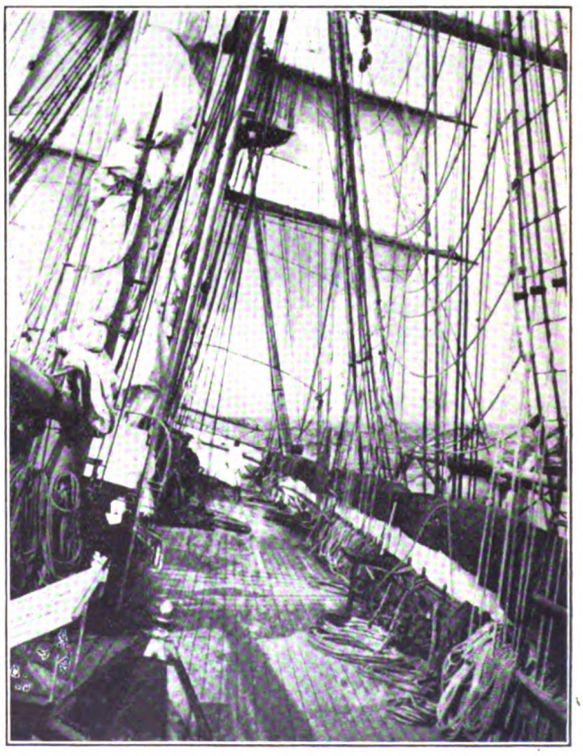


The old school ship "St. Mary's" on the Hudson River.

conducted by men of ripe experience, not simply clever mathematicians, political favorites or ex-naval officers however efficient or of however blameless character these may be. The officers of a school ship should be men whose daily life has fitted them to advise and instruct young men for their life work. Too great an emphasis on this phase of the subject is impossible and these words are written out of a long experience and with an intimate knowledge of the subject.

The curriculum of a school ship should be broad and comprehensive and while it should embrace the essentials of primary education it should in no way duplicate the elementary schools. There is at present a great need of good text books by American authors such as Brady's "Kedge Anchor Up To Date," Robinson's "Seamanship," etc. The handling of heavy weights and the proper stowage of general cargo are subjects of vast importance and there are a number of foreign publications which cover these subjects remarkably well. To detail at length just what grounds a school ship course should cover would exceed the limits of this brief article, however interesting such an exposition might prove.

Let us stand shoulder to shoulder with the great men of the West whose voices have stirred Congress in the past until a school ship for every important sea port in these United States is an accomplished fact. Give us this much and the intellect of our nation will furnish all other requirements for the fulfillment of the mission of the school ship which is to fit the youths of the land to carry the Stars and Stripes over every sea to all peoples of the earth in peaceful, helpful commerce.



Running free in the "trades."

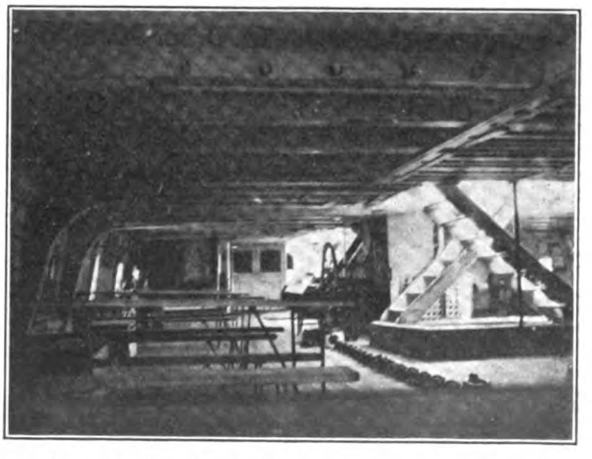
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English Attitude on Government Ownership

WE publish below in full an article appearing in the English magazine Syren and Shipping anent the proposed Shipping Bill, and President Wilson's championship of the same. The article is rather rabid in its tone, but is interesting on this account as it voices the extreme in the disapproval of this measure, a disapproval and skepticism which seems to be general throughout the English press. Boiled down to a single argument, the English viewpoint would seem to be, "Why should the United States worry about ships when they can ship all the goods they wish to in English bottoms?" The article states, "Amongst the little things which it (the return of the American ship as a factor in ocean commerce) would involve, would be the entire abandonment of the system of protection." We have no doubt that the entire abandonment of the system of protection would place the American ship once more on the ocean as it would place the American ship, which is now unprotected, on a par with everything else that was American. But is it not equally true that the same result could be obtained by extending the protection system to include the ship?

The article in question follows:

In his message to Congress last week President Wilson gave the "American sea-going mercantile marine" movement his unqualified blessing, expressing his earnest hope that the pending Shipping Bill would be adopted by both houses. It was, he declared, a piece of legislation which was imperatively needed and could not wisely be postponed, but in the condensed reports of his message which are at present available we fail to find that he supported this academic statement with anything in the way of really convincing argument. Maybe when we get the full text of his communication we shall find something in the nature of reasoning, but at the moment it looks as if President Wilson had adopted the methods of the bar-parlor orator, who thumps the table with his fist and shouts that "we must have this," or "we will have that," without being able to show a single reliable why or wherefore. True, the President referred to the new conditions which are being created by the war, but that was no argument at all. In gauging the possibilities of a situation, the mere fact that opportunities exist counts for nothing. One must be able to show that one is able to profit by them, and that, so far as we can make out, is just what the head of affairs in the United States has not done. He said that the war had interrupted the means of trade and the processes of production in Europe; that it was destroying resources upon a scale unprecedented and appalling. Undoubtedly it is, but it has destroyed very little merchant shipping. Germany's destruction of British vessels has been on so small a scale as to be practically a negligible quantity, while we, in our turn, have sent scarcely any German merchant ships to the bottom. We have captured them wholesale, and driven them to seek sanctuary in home and neutral ports, but they are still in existence, ready for service again when the war is over. "The time is near," continued the President, "when several countries of Europe will need our help and our manifold services as never before, and the United States should be ready with her resources, her energies, her forces of production, and means of distribution." A fine, plump, well-founded sentence, that, so far as outward appearance goes, but what is there inside it? It rather reminds one of a boiled orange. We can imagine the President gazing at it with pride when he had written it, but we doubt whether even he himself quite understands what he meant by it. Having delivered himself of it, he, metaphorically speaking, burst into tears. "We have," he said, "the resources, but are not fully ready to use them, nor the means of distribution. Speaking plainly, we have grossly erred in the way we have stunted and hindered the development of a merchant marine. Now, when we need ships, we have not got them." Sad, indeed; but sadder still is the fact that Mr. Wilson had omitted to show that America could make profitable use of the ships if she had got them. It is all very fine to draw a thrilling picture of European countries holding out appealing hands to America, and of America, with her resources, etc., ready to fill those hands to overflowing, but what is all this talk of the "means of distribution"? Are we to suppose that until America has ships of her own she cannot come to the rescue of stricken Europe? If she entertains such an idea she may rid her mind of it at once. The British shipowner will be very pleased to convey her "resources" to the quarter where they are needed, and he will do it far more cheaply than she could do it herself. President Wilson admits that "to correct all the mistakes by which we (the United States) have discouraged and all but destroyed the merchant marine of the country would take a long time and involve many detailed items of legislation." It would, without a shadow of doubt. Amongst the little things which it would involve would be the entire abandonment of the system of Protection. If America wishes to compete on the seas with a free trade country she must become a free trade country herself. Otherwise, juggle with the proposition as she will, she will find it an unsound one. President Wilson, it seems, does not propose to correct the mistakes which have been made. His line of action would be similar to that advocated by a renowned countryman of his, i. e., to "run a moist pen slick through everything, and start afresh." To his remark which we have quoted above he added the words: "and trade which it might immediately handle would disappear and find other channels while we debated on the issue. Therefore we propose another way of providing means of transportation which must precede and not tardily follow the development of our trade with neighbor States. American routes of trade must be opened by many ships with regular sailings and moderate charges before the streams of merchandise will flow freely and



Gun deck of the "St. Mary's," looking aft on the starboard side.

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profitably." Possibly we are obtuse, but for the life of us we cannot follow the President through this maze of rhetoric. The economic conditions which obtain in the United States have strangled the American shipping industry. No attempt is to be made to remove those conditions, but a new shipping industry is to be created which will prove a conspicuous success. We are loath to say anything rude, but really this seems more like a madman's dream than the considered plan of a statesman. If American shipping could not be made to pay yesterday it cannot be made to pay to-morrow, unless the conditions which militated against it are done away with. It may be made to show a profit on paper, but the loss will be there all the same. No man ever got rich by taking money out of one of his pockets and putting it into another. But, after all, it is not very patriotic of us to criticise the movement in this disagreeable fashion. The passing of the bill would mean that the United States would come into the market as a heavy purchaser of second-hand tonnage at fancy prices. This would mean money in the pocket of the British shipowner, who would then proceed to spend some of it on new tonnage to compete with the old material which he had disposed of. Presently, when America had made another unearthly mess of the business, she would be wanting to get rid of her purchases again for next to nothing, and there would be some cheap bargains to be had. Therefore we ought rather to back up President Wilson right heartily, regarding him as a benefactor in disguise. By the way, in dealing with naval matters, he put a question which seems to indicate hopeless futility —unless, of course, the cable summary of his message does him an injustice. "A powerful navy," he is reported as saying, "we have always regarded as our proper and natural means of defence, but who shall tell us now what sort of navy to build? The country has been misinformed." That a man who could utter such a pitiful bleat as this should be at the head of a great Republic is truly terrible. Imagine what woud happen in this country if the Prime Minister stood up in the House of Commons and asked whether someone would tell him "what sort of navy" we ought to have!

The criticisms of President Wilson contained in the above article come with peculiarly bad grace at this time however. It is not so very long since President Wilson was "A cultured and honorable gentleman who would not let the desire of any majority swerve his sense of justice when England wanted the canal tolls adjusted in a way highly favorable to herself." Reputations do not seem to last very long in these parlous times.

IN DUTCH.

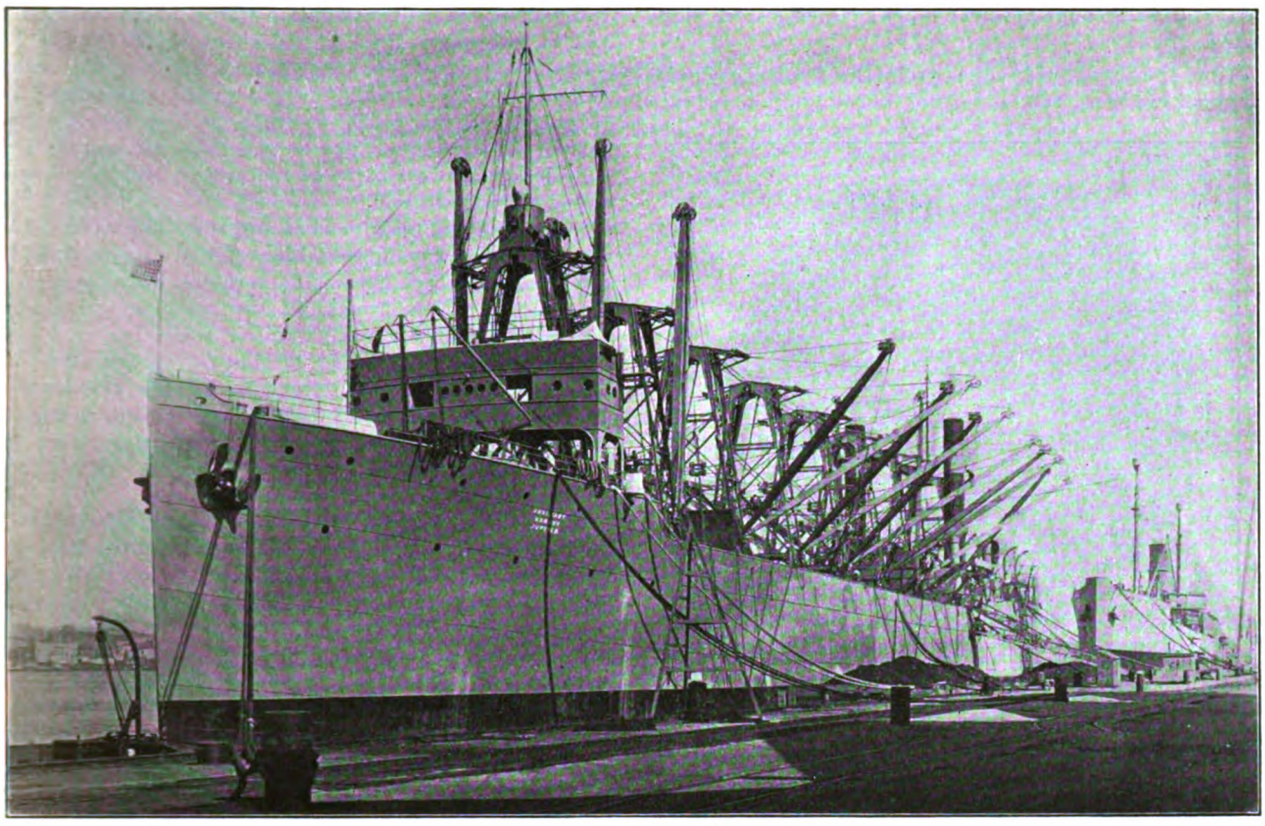
Bellingham is a long way from the scenes of hostilities in Europe, but no matter, this enterprising city is near enough to the war to feel the direct effects of the unfortunate situation. In the harbor are several interned German ships and thereby hangs a martial tale. Butt logs must be split up and the method employed is to bore a hole in the log, insert a stick of dynamite, light the fuse and then retire to a respectful distance. One night a large number of these logs were to be dynamited. This work can only be carried out at low tide and low tide on this particular night occurred at half past one. After the first four or five explosions the crews of the German vessels came up on deck armed to the teeth to repel boarders. The captain of one of the ships explained that he and his crew felt quite certain for a few minutes that they were the victims of some dark and bloody plot on the part of the Allies.

Mr. C. L. Bankson has been appointed Assistant Purchasing Agent of the Great Northern Railroad and will have charge of the buying for the Great Northern Steamship Company operating the "Great Northern" and the "Northern Pacific" on the Astoria, San Francisco route.



Work is progressing rapidly on Prince Rupert's new shipbuilding plant.

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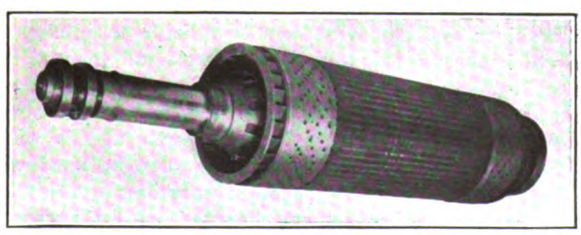
"Jupiter" showing elaborate coal handling gear.

Turbine Propulsion

THE tendency of the present age seems to be more speed in everything. The trolley has supplanted the horse car and the automobile the horse and buggy. Tool steel has been improved to such an extent that machine tools are run at speeds far beyond anything dreamed of a few years ago. Centrifugal pumps have in many ways supplanted the slow running plungers and the high speed turbine is supplanting the reciprocating engine. The limitation of these speeds is not altogether in the prime mover but in the recipient as well, thus the high speed lathe is of no use without a steel tool that will stand it. The high speed express train is valueless without a good road bed and the turbine has no utility unless driving something that can properly receive the high speed.

In ship propulsion we are learning that the high speed turbine is a great improvement over the reciprocating engine, but we must alter our methods to apply it. The electric drive on the United States collier "Jupiter" is an example of this kind and its operation has opened the eyes of the followers of former methods. The question naturally arises, how can we serve anything by generating steam power, putting it through an engine, thence through a generator, thence through motors and finally to the ship's propeller? Would there not be a saving by putting the generated steam into an engine and thence directly on to the propellers? A similar question might be asked about driving machine tools, but in the best shops the machine tools are now driven by individual motors. High efficiency in the turbine is obtained through high speed; high efficiency in the ship's propeller is obtained through comparatively low speed and, if we could bring the two together without sacrifice in other directions, we have an efficient system. This may be done by electric transmission or by gear transmission and either system has its proper application and both are daily growing in popularity.

It now transpires that the battleship "California," to be built in the New York Navy Yard, will be electrically propelled in a manner similar to that employed on the collier "Jupiter." This seems to be a wise decision by the Navy Department and the Merchant Marine should profit by the experience gained during the exhaustive experiments and trials with the latter vessel. The "Jupiter" was put into commission in the spring of 1913 and since that time most careful tests have been taken and records kept of her performance, in fact, the "Jupiter" was equipped with this class of machinery with the particular idea of testing its operation for use in larger vessels. In April, 1914, we published a description of the trials of the "Jupiter" written by Lieutenant S. M. Robinson, U. S. N., who has been in constant charge of the machinery since its installation. The data in this article showed the "Jupiter" capable of performing all that was expected of her with some margin and many

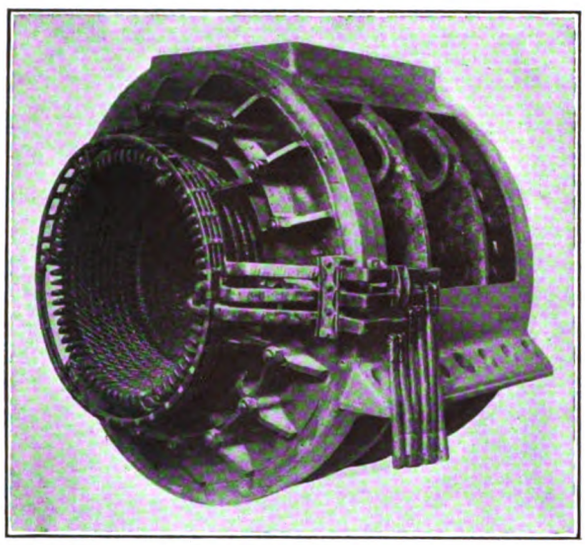


Revolving field for U. S. S. "Jupiter."

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of the ills attending the older types of engine were eliminated.

After the first trials, chiefs from the Bureau of Steam Engineering were sent out from Washington to witness



Type A. T. B. 2-5450-1990 Armature for U. S. S. Collier "Jupiter."

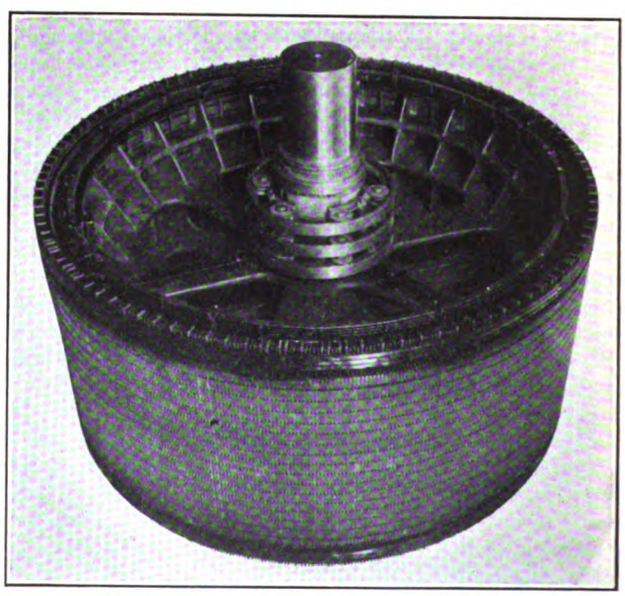
the final trials and they became firm supporters of the electric drive. The vessel was then sent to the Atlantic Coast by way of the Panama Canal where the higher-ups of the Navy could inspect for themselves and learn of the behavior of the machinery from those who had been handling it for a year and a half, so that it was after thorough study and trial that the Navy Department decided to place the electric drive in the new battleship "California."

The specifications for this and the two other battleships, designated as No. 40, No. 41 and No. 42, call for direct turbines at a speed of 240 revolutions. This is a high speed for a propeller and a low speed for a turbine, if economy is expected of either. Mr. W. W. Smith, in the International Marine Engineering of October, 1914, points out how geared turbines would be superior to direct driven turbines in a trans-Atlantic liner in point of weight, space and efficiency, and, we presume, price as well. It seems that our Navy Department has carried this idea a little further in using the electric drive. On the battleship, we understand, there will be two turbo generators instead of one as in the "Jupiter." The four propellers will be direct connected to motors, the maximum speed of which will be 160, a speed best suited to the propellers, the motors, of course, being specially designed to suit that speed. The motors by changing through connections can be made to run at full speed, 160 revolutions, or half speed, 80 revolutions, per minute. Between these points the speed will be regulated through the turbine as is done on the "Jupiter." Any propeller can be reversed at will and full backing power can always be obtained. In this case transmission of power to the motors is made by copper wire instead of steam pipes and the wires are less liable to injury, are easy to keep in repair and occupy but small space. From 18 to 21 knots both turbines will be used with the motors at high speed connections, the full speed horsepower being estimated at 33,000. From speeds of 18 down to 15 knots one generating set can be used with the motors still at high speed connections. Below 15 knots one generating set can be used with the motors at their low speed connections. At a cruising speed of 12 knots the propellers would consume about 4000 H. P., and at full speed of 21 knots, about 33,000 H. P. The water rate should be somewhat better than the results obtained on the "Jupiter," which varied between 10 and 12 pounds to the S. H. P. from cruising speed to full speed. This appears like a very flat efficiency curve, considering that all parts of the system will be working under normal stress.

The proposed arrangement on the "California" is a marked improvement over that of the "Jupiter" as the condensers are set below the turbines on a level with the motors which brings all the machinery, including condensers, within a comparatively small space.

Whether the high speed turbine be connected to the low speed propeller by means of electric transmission or gear transmission, we believe the electric turbine is the logical prime mover for utilizing steam pressure and the Merchant Marine will have to follow the example of the Navy to keep abreast of the times.

The ability to steam at a cruising speed, and also a fighting speed economically, is a great advantage in a battleship but this feature also finds favor in an ocean liner. A premium has been placed by other countries on vessels that will develop a higher rate of speed than their normal running speed, making them useful as naval auxiliaries in time of war. The electric drive with two speed motors will accomplish this result in the merchant ship at a cost under the bonus offered for it. The value of reduced steam consumption is most important in both Government and privately owned vessels. It can be capitalized into larger steaming radius, higher speed, more cargo capacity or be divided among these advantages in whatsoever proportion one may choose. The only thing that remains for the shipowner to satisfy himself on is the reliability of the outfit. This, we assume, has been the unknown quantity from the start



Rotor for type 1 36-2750-110 M. 2300 for U. S. S. Collier "Jupiter."

and our Navy has satisfied itself on this point by long experience on the "Jupiter" before going ahead with the "California."

The British steamer "Harfleur" has been sold by the Union Navigation Company to Strachan & Company of Savannah and has been placed under the American flag, her name being changed to "Georgiana."

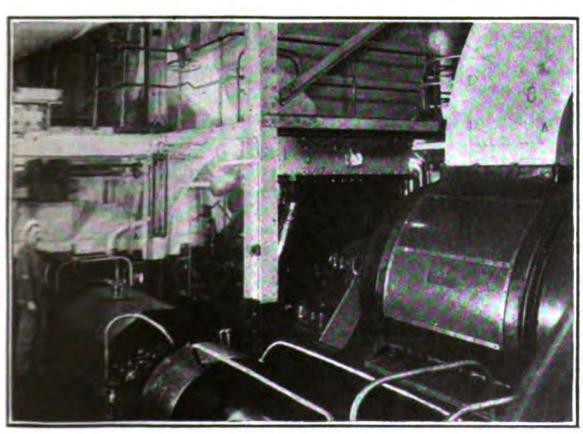
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Résumé of Lieutenant Robinson's Paper

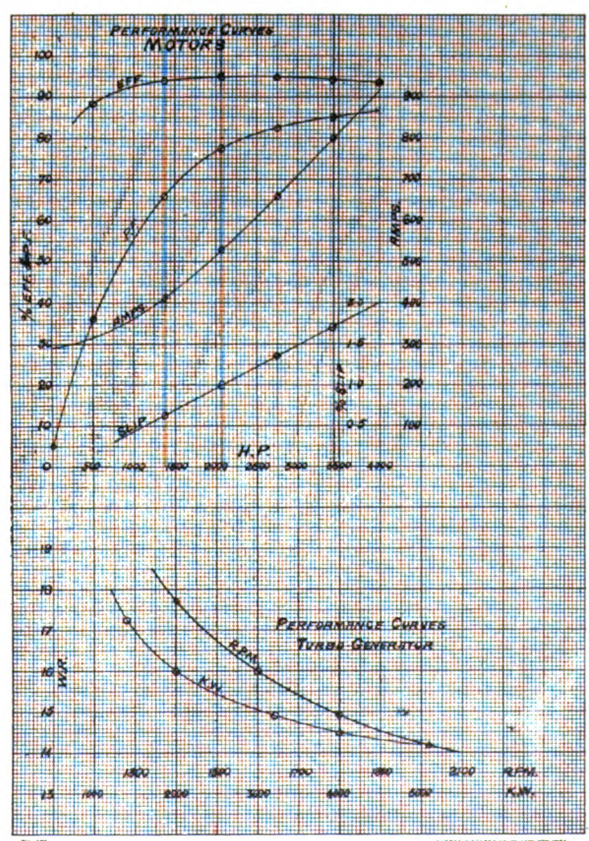
Recently Read Before the Society of Naval Architects and Marine Engineers.

IN view of the fact that electric propulsion of the type tested in the "Jupiter" is now being introduced in one of the three battleships of this year's program, this paper was of unusual interest. The author drew attention to the fact that the motors for a battleship would differ in one particular from those used on the "Jupiter." The stators would be provided with pole-changing switches so that there would be two speed reductions between generators and motors. This would enable the generators to be run at full speed both at the full speed of the ship and also at some intermediate speed nearer the cruising speed of the ship. The normal cruising condition of the ship would be to have one generator running and to have the pole-changing switches on the motors thrown so as to give them the larger number of poles and consequently the greater speed reduction. This combination would be used till the speed limit of the turbine is reached; this point would probably be about 15 knots in a 21-knot ship. From this point on to about 19 knots, one generator would be used driving four motors with the pole-changing switches thrown to give them the smaller number of poles. For speeds above this both generators would be used, each driving two motors with pole changing switches thrown to give them the smaller number of poles. For electric propulsion as applied to battleship work the author claimed advantages in (1) reliability, (2) manoeuvring qualities, (3) economy, (4) space occupied, (5) weight, (6) care and upkeep. As to point one, the reliability of induction motors and large high speed turbo generators for land use had been well known for some time, but up to about 18 months ago had not been demonstrated on shipboard. However, experience at sea with them has not developed any trouble and their reliability is now unquestioned. One thing that makes this installation more reliable than other forms of turbine drive, is the fact that the turbine revolves in the same direction constantly. The importance of this may be appreciated from the fact that the greater amount of blading trouble that ships have had is nearly always due to the distortion that occurs when backing. There is also one other advantage when compared with reciprocating engines, the turbines would be much less susceptible to damage from water when the boilers are priming. This fact has been thoroughly demonstrated by experience on the "Jupiter." As to point number two the following advantages are pointed out: no heavy throttles to open or close; light easily handled oil switches and a speedy controller are used instead. No racing of the propellers, easy speed regulation, better stand-by qualities and finally full power available in astern running. As regards (3) the gain in economy claimed is over 20 per cent. both at high and cruising speeds. As to the actual space (4) that the machinery would occupy, the electric drive would take up less room than any other with the possible exception of mechanical gearing. As to weight, number five, here again the electric drive is said to be superior to any other method with the possible exception of mechanical gearing. It is rather difficult to say exactly how the two methods would compare as regards either space or weight as a great deal would depend upon the number of turbines used in order to get 30,000 shaft horsepower. Judging from the largest sizes of geared turbines now in use the advantage would rest with the electric drive.

As regards care and upkeep (6) the electric drive is deemed greatly superior to either reciprocating engines or direct-connected turbines; also, due to the fact that the turbines do not have to reverse, it would be superior to the geared drive in that it would have less blading trouble. Either of the two latter methods, however, is



Turbine and Generator.

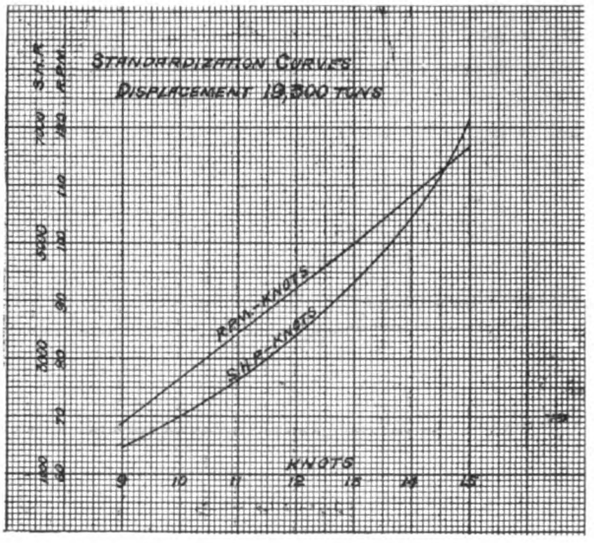


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very satisfactory in this respect, as a high-speed turbine is so small that it is easily handled and repaired by the ship's mechanics. The author closed his paper with the trial data of the "Jupiter," which is a single-deck ship designed for a speed of 14 knots on 5500 s. h. p., with a displ. of 19,300 tons at a draft of 27 ft. 8½ in. The ship measures 542.2½ ft. by 65.3 ft. by 27.8½ ft., with a block coefficient of .7215. There are 3 double-ended Scotch boilers and an upright donkey boiler designed for a working pressure of 190 lbs., and fitted with forced draft. The twin propellers are of manganese bronze weighing 13,900 lbs. each and measuring 15 ft., 11 7-16 in. diameter by 14 ft. 5 1-16 in. pitch. The main propelling machinery consists of a nine-stage Curtis turbine, a two-pole three-phase AC generator, two 36-pole, three-phase induction motors, two water-cooled rheostats, and one main switchboard. The weight of turbo-generator bed plate is 16.3 tons, of turbine 28.7 tons, of generator 35.7 tons, of the two motors 76.8 tons. The turbo-generator furnishes power to the motors, the function of the generator and motors being solely that of a reduction gear. Changes of speed are made by changing the speed of the turbine, thus varying the frequency of the generator, and consequently the speed of the motors, the reduction in this case being 18 to 1, plus the slip of the motors. The motors are wound for only one number of poles and therefore the speed ratio is not changeable as it would be for a battleship installation; the reason for this is that such change is not necessary as the cruising speed is practically the maximum speed. Speed changes are accomplished by means of a small control stand in front of the switchboard. The General Electric Co., in its contract with the Government, guaranteed a water-rate of 15 pounds of water per shaft horse-power hour delivered to the propeller shafts at ten knots, and a water-rate of 13 pounds of water per shaft horse-power hour delivered to the propeller shafts at the highest speeds attainable. The Government guaranteed to furnish steam to the turbine at 190 pounds (gage), or to allow an increase of one per cent. per specified horse-power for each 10 pounds of reduction in steam pressure. It also guaranteed to furnish 28.5 ins. of vacuum or to allow an increase in the water rate of 5.0 per cent. per specified horse-power per inch of reduction in vacuum. Results of the preliminary trial:

	48 hours	24 hours
Date of trial	Feb. 14-14	Feb. 18-14
Speed, in knots	14.99	10.01
Draft, mean	27 ft. 9 ins.	27 ft. 7½ ins.
Displacement, in tons	19,452	19,350
Pressures (gage)—		
Main steam, boilers, pounds	193.8	193.9
Engine-room, pounds	185.8	186.44
Turbine, pounds	168.4	180.56
1st stage, pounds	56	8.5
Forced lubrication, pounds	30	30
Oil to governor relay, pounds	80	75
Steam seals, pounds	5	5
Auxiliary exhaust (absolute)	23.19	23.68
Air pressure to boilers, in inches of water	.712	
Vacuum, inches	28.2	28.5
Revolutions or double strokes per minute:—		
Starboard motor	116.72	77.077
Port motor	116.72	77.077
Main turbine	2,130	1,410
Wet air pumps	3,600	3,600
Dry air pumps	112	113
Circulating pumps	193	196
Feed pumps	22	17
Blowers	329	
Temperature, in deg. Fahrenheit:		
Main injection	55	55
Overboard discharge	78	72
Hottest bearing (middle)	133	115
Oil from cooler	99	85
Feed water	191.9	215.9
Field amperes, main generator	251.5	184
Volts, main generator	101.4	69.44
Volts, main generator	2,580.6	1,524
Amperes, starboard motor	725	395
Port motor	755	413
Main generator	1,480	808
Kw., starboard motor	2,692.7	712.5
Port motor	2,833.1	751.3
Total Kw	5,525.8	1,463.8
S. H. P., starboard shaft (torsion meter)	3,603.258	1,053.950
Port shaft (torsion meter)	3,548.677	961.08
Total (torsion meter)	7,151.9	2,015.04
Water consumption data:—		
Total pounds per hour	105,764	40,066
Pounds per hour auxiliaries	22,212	15,246
Turbine	83,552	24,820
S. H. P. (turbine)	11.68	12.316
Guaranteed water-rate, pounds	13	15
Fuel consumption data:—		
Pounds of coal per hour	11,900	5,050
Pounds per hour per S. H. P.	1.662	2.5056
Pounds per sq. foot heat. surface	.613	.261
Tons per day	127.39	54.082
S. H. P. per square foot of grate surface	15.9	4.48
Knots per ton of coal	2.82	4.43

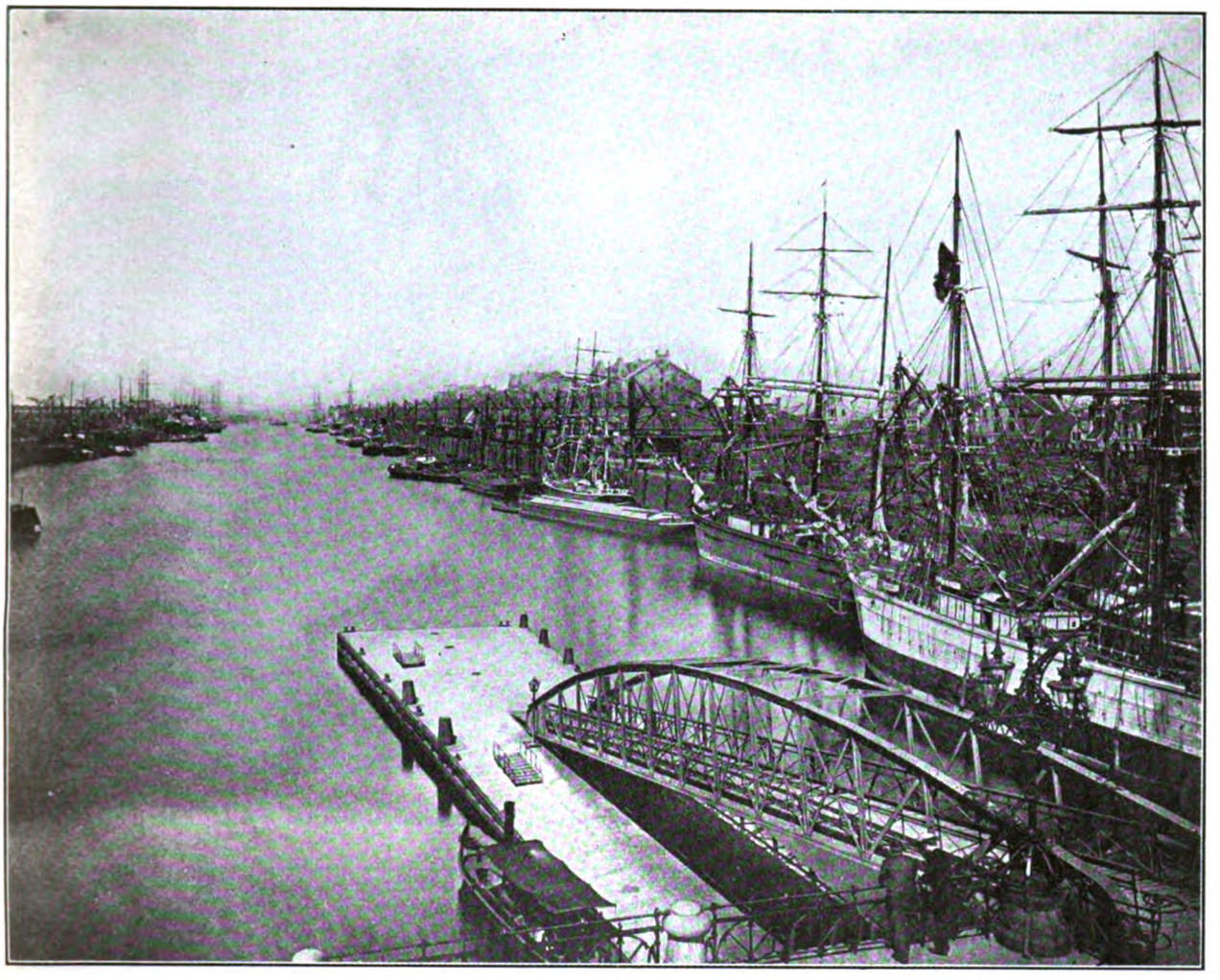
The "Jupiter" has been in commission over a year and a half. During that time she has conducted two official trials and has carried on the unusual routine work of a navy collier. She has steamed about 14,000 miles and has been handled a great deal around docks, in narrow channels, and other places where a great deal of engine handling was required. About one-half of



the steaming has been done in the tropics with circulating water over 80 deg. F., and with correspondingly poor vacuum, so that the economy of the ship is known under all conditions. The fuel economy has proved to be excellent, being, on the average, about 25 per cent. better than the best of her sister colliers. During the whole period of commission, two repairs have been made to the main engine. The first was to reblade the first stage of the turbine. This work was done entirely by the ship's mechanics. The other repair was to replace one of the porcelain cylinders which carry the resistance. This was done on board in two hours.

The Seattle Construction & Dry Dock Company has secured the contract through the Lake Torpedo Boat Company for the hulls of three of the new submarines recently ordered by the United States Government.

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A German port before the war; showing the large number of South American grain ships.

Mechanical Handling of Bulk Cargoes

By McL. HARDING, Terminal Engineer, New York.

THE most valuable commodity of to-day is time. To save time enormous sums of money are continually being expended, in transportation, manufacturing and in all industries of transportation.

Terminals form a most important part of transportation, in fact, about 50 per cent. of the railroad capital is invested in terminals and, in time, in the United States, there will be an equivalent amount in marine terminals.

The saving of time at marine terminals is so important that where the port authorities or terminal managers are keenly alive to the interests entrusted to them, every standard and proved device that will aid in discharging and loading ships more promptly, is being installed.

In the olden days of the sailing ships when a single voyage might consume six months, a year, or even longer, a month or two in port, alongside a wooden pile wharf, often dilapidated, for discharging, loading, refitting, and for the captain to visit his family, was not considered excessive. Generally the crew was discharged, only one of the mates and ship's keepers being left on board.

When, however, the charter value of a steamship is from $500 to $1,000 per day, and when the occupied berth of permanent, fire resisting concrete and the contiguous sheds, warehouses and the land may represent an investment of a million dollars, then the time saved may be the dividends to the steamship owners and a saving to the city by not requiring the investing of other millions for additional piers or quays.

Many cargoes are composed of bulk material such as coal, ores or other similar substances, and these should have the time-saving appliances, similar to those at foreign ports which are used for handling of package freight.

Only a few years ago, ore, coal, sand and rock were hoisted from the ship's hold by the ship winches and booms, dumped into barrows and wheeled to the ore pile at a cost exceeding thirty-five cents per ton, and this was considered the only way possible.

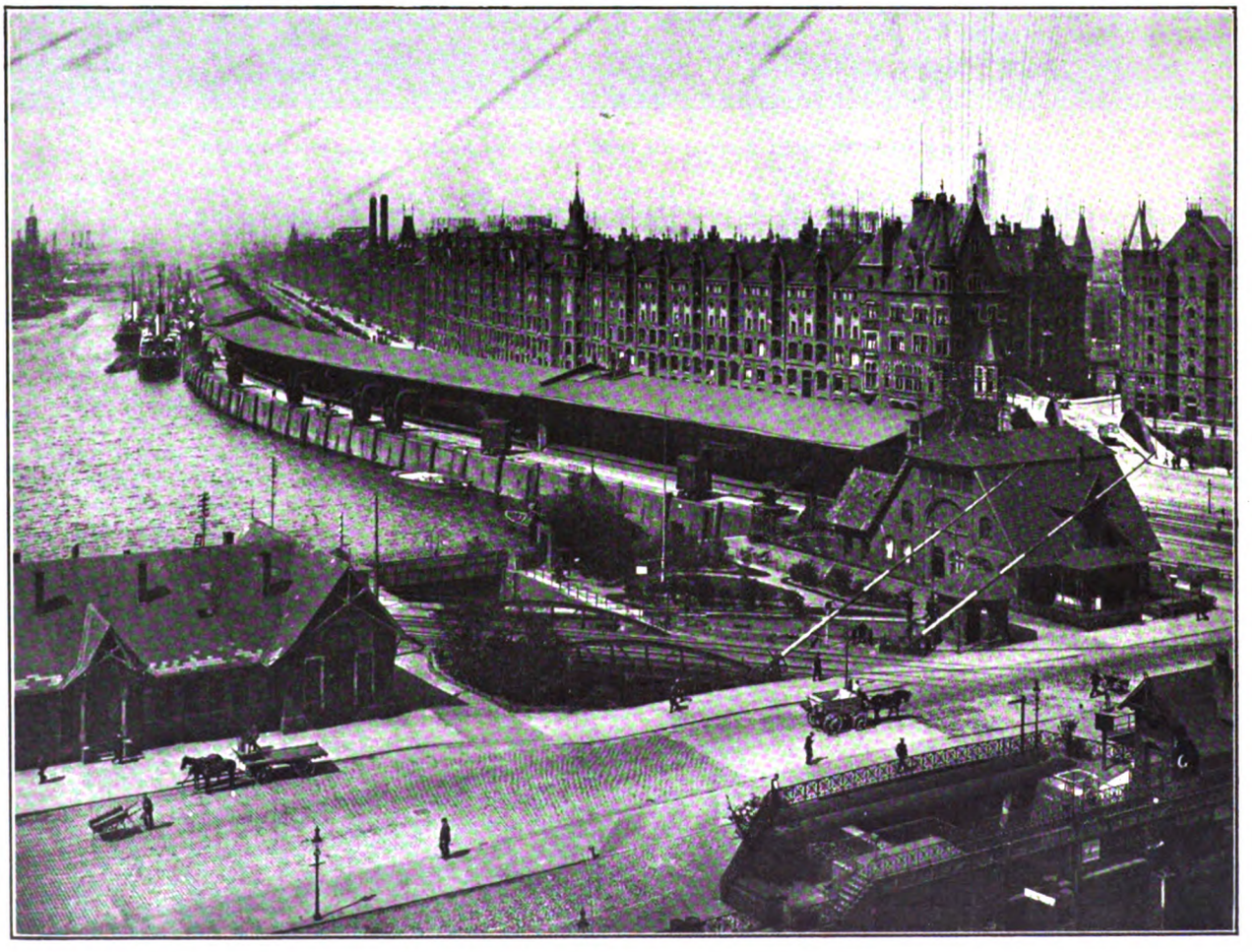
After long arguments, the president of the Lake Shore Railroad was persuaded to install an American ore unloader. After months of trial and discouragement, encountering the active opposition of stevedores and truckers, the order was given to remove the machine, and return to the old reliable wheel-barrow.

The inventor pleaded for one month longer, which was finally granted, and to-day, by the same machine, millions of tons are handled and the cost is reduced to between two and three cents per ton, including interest

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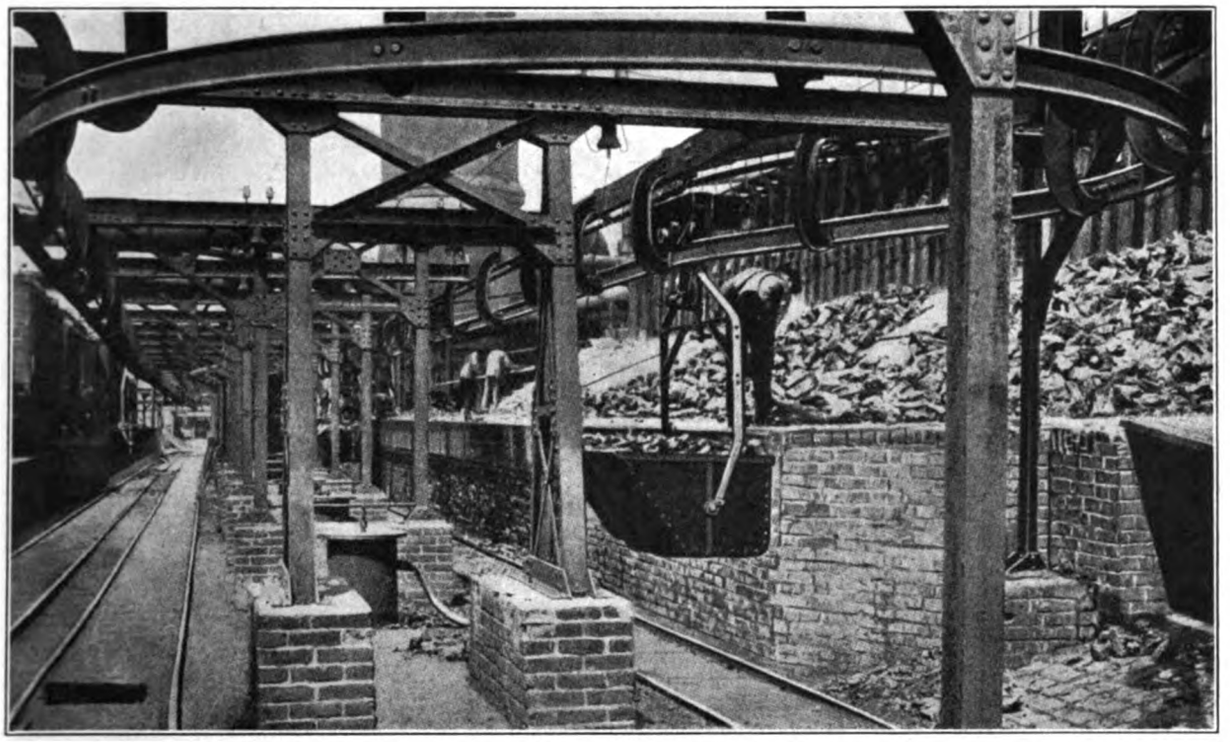


Twelve bulk material unloaders at Ashtabula, Ohio, spanning the railroad tracks and the dump piles and transferring directly from the ships to the cars. Other bulk unloaders on the opposite side of the ship.

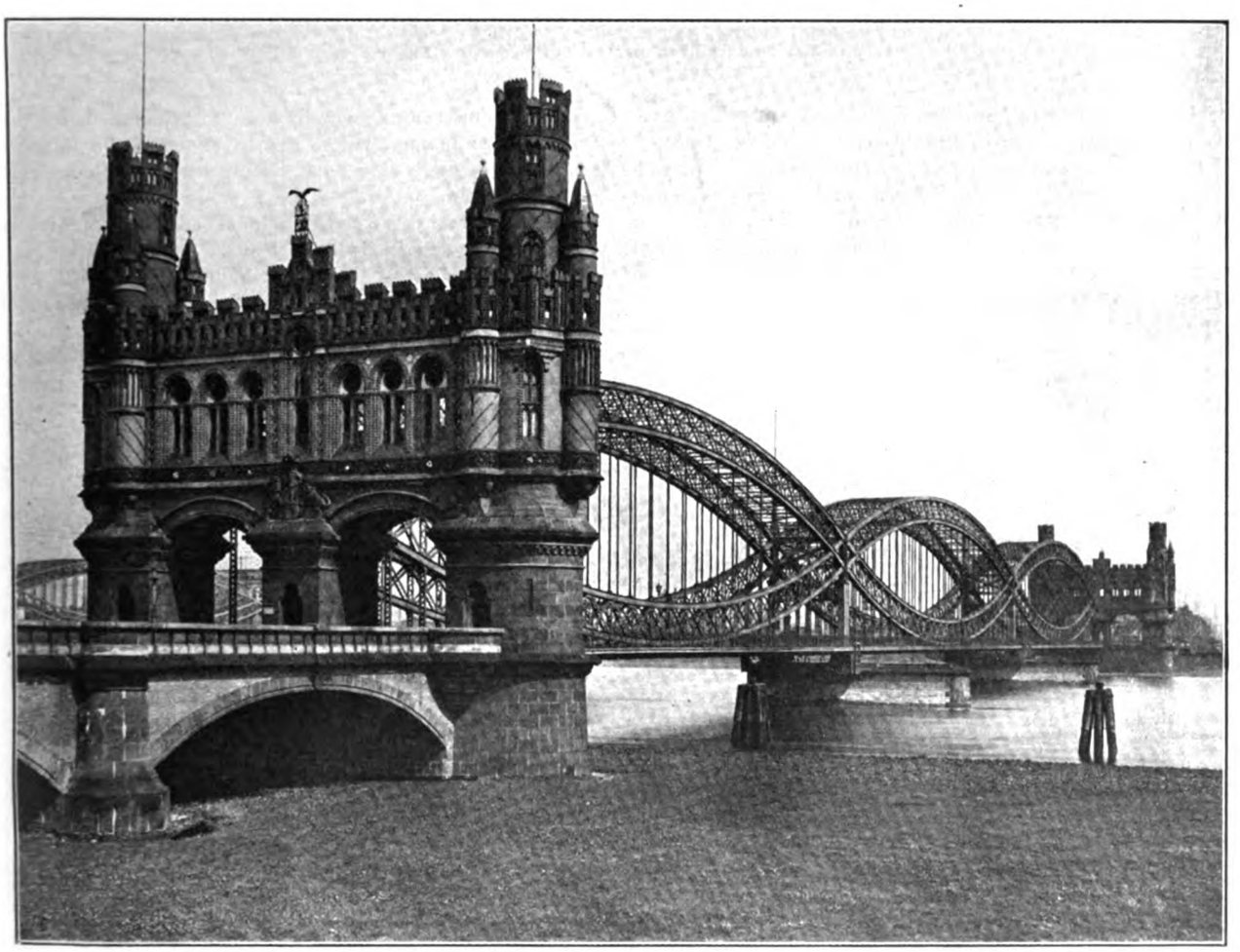


A corner of the free haven at Hamburg.

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Overhead electric conveyors are extensively used for long distance transportation of bulk materials in Germany.



The splendid river bridge at Hamburg.

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The rule at Hamburg is a gantry crane every sixty-five feet.

on the investment in the machinery, and hours are now taken to unload where formerly days were required.

The inventor, whose name is now greatly honored, told the writer that the happy day of his life was when the same president gave him an order for fourteen of the same machines, not stipulating what the price should be, but only that the machines should, without fail, be delivered in a certain limited time.

When on a 10,000 ton cargo over three thousand dollars could be saved in labor alone, and in addition a saving effected on the charter value of the ship, and the vacating of the berth for other ships, the first cost of the machinery was not to be compared with these savings.

There are given photographs of certain classes of ore handling machinery of American design and manufacture, which have been successful in discharging vessels of bulk freight. These will give an idea of how many discharging machines of one type are concentrated over one ship.

There should be in every important seaport piers as completely equipped for like service.

Mention was made of the fact that the former cost of handling the ore by the hand truck and barrow was about thirty-five cents per ton.

The following from reports of the United States Government also shows plainly the duty of port authorities as to package freight handling, if they do not wish to be considered as relics of the sailing ship days, only awaiting the call from "aloft."

The dock board of New Orleans has allotted to the Southern Pacific a frontage of 2100 feet. The total incoming and outgoing tonnage transferred in the calendar year 1912 was 581,172 tons.

There are no mechanical devices except continuous conveyors or ramps, which were not installed to take the place of manual labor, but to expedite the handling of freight through side ports during low water conditions of the harbor.

The character of freight includes every class of merchandise handled in New Orleans.

The average cost per ton for handling was 54.85 cents per ton of 2000 pounds. The price paid for labor was 30 cents per hour per man for trucking during the day and 40 cents per hour for labor after 6 p. m.

It is estimated by the use of ship's derricks and manual labor the cost would be approximately 25 per cent. greater. On January 25, 1913, in discharging the "Antilles" there were employed 355 men, the tonnage unloaded being about 150 tons per hour, or about 43 one-hundredths of a ton per man per hour. In loading, 65 one-hundredths of a ton per man per hour.

As the cost by modern machinery can be reduced to fifteen cents per ton for inbound freight and less for outbound, it will be seen that the saving per ton will be more than that saved in the handling of bulk freight.

There are herein given views of package handling machinery from foreign ports.

Each machine is guaranteed by the manufacturer to be able to raise from the hold of the ship forty drafts per hour, called a cycle, of from two to five tons per draft and at five hatches two, sometimes three cranes at each hatch; two tons per draft, would be able to discharge, $10 \times 40 \times 2 = 800$ tons per hour—assuming one ton per draft would be four hundred tons per hour.

How extensively the Germans install such machinery is evidenced by the views given.

The following figures represent the actual average use of the whole of the certain quays at foreign ports dur-

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ing recent years. The first list is not wholly mechanically equipped.

	Tons per lineal foot.		Tons per lineal foot.
Rouen	161	Buenos Aires	198
Boulogne	176	Marseilles	221
Havre	128		

Limiting the figures to those quays furnished with modern machinery, in some cases the figures are from the same port, it will be noticed how much greater tonnage is transferred per lineal foot:

	Tons per lineal foot.		Tons per lineal foot.
Rouen	302	Havre	476
Boulogne	374	Marseilles	564
Bordeaux	447		

Conclusions.

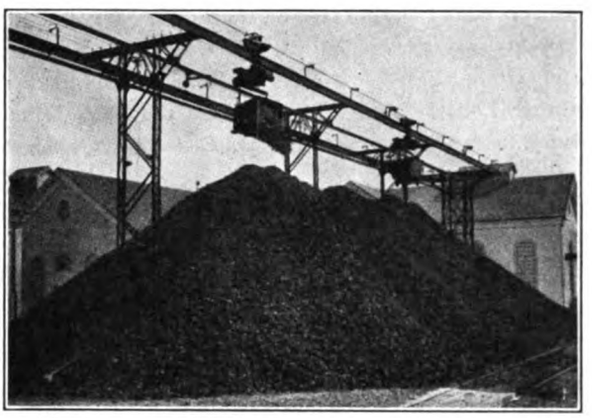
First. That at the ocean ports, bulk cargoes should be discharged as cheaply as at Lake ports, the tonnage and type of vessel being considered.

Second. That miscellaneous cargoes should be handled as cheaply as at foreign ports.

Third. That if the United States is to compete for the trade of the world, its manufacturers, its merchants, skippers and consignees should not be handicapped by unnecessary detentions of its ships and high cost of cargo transference.

Fourth. That the total investment at a port for piers, quays and mechanical appliances, per tonnage handled, is far less where freight handling machinery is installed.

Fifth. That a port not equipped cannot compete successfully with ports with such facilities, other conditions being equal.



Automatic dischargers at the dumping piles.



The cranes bridge over the railroad tracks at the edge of the quay.

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W. R. Eckart

THE career of the late W. R. Eckart was one full of peculiar interest to the engineering fraternity of the Pacific Coast as his various activities brought him in close working contact with mechanical engineers, electrical engineers, civil engineers, naval engineers, mining engineers and marine engineers. For a good many years he was as familiar a figure on San Francisco's water front as he had previously been on the great "Mother Lode." Many of the marine engineers in active service to-day will remember Mr. Eckart's work in their profession and so, while the mining and power plant work of Mr. Eckart were more prominent, it is fitting that we add our words of respect and praise for the memory of a man so intimately connected with the past progress of nearly all classes of engineering work on the Pacific Coast.

Mr. Eckart was born in Chillicothe, Ohio, June 17, 1841. About 1842 his parents moved to Cleveland, where his father owned large interests in lake vessels. His primary education was gleaned from the public schools of Cleveland and Chillicothe and rounded out with a special course in mathematics. In the middle of the fifties, the elder Eckart moved to Zanesville, Ohio, and held a managing interest in the Putnam Flouring Mills, the power for which was derived from six waterwheels, each wheel driving "one set of burrs." It was while assisting the millwright in putting improved waterwheels in this mill that the opportunity was offered young Eckart to serve as an apprentice in the works of Griffith, Ebert and Wedge, a shop having a high reputation in those days for mill and steamboat work. Mr. Wedge, the Junior partner of the firm, took a great interest in Eckart and saw that the lad's time was not wasted.

During this apprenticeship Mr. Eckart made numerous trips on the trials of new river boat engines, which led to a desire to serve the Government as a naval engineer. On July 2nd, 1861, he was examined by a board of engineers, of which William H. Shock was president, and was passed as a number one. At this examination Eckart met Dr. R. H. Thurston for the first time. While attached as a third assistant engineer on one of the vessels of the Pacific station he arrived in San Francisco in the latter part of 1861 where he met and formed friendships with many of California's first engineers, including Paul Torqua, Joseph Moore, Irving M. Scott, Wallace Hanscom, Huttner, Specht and many others.

On July 10th, 1864, Mr. Eckart resigned from the Navy on account of ill health and took up residence in San Francisco, his first work here being as a draftsman for H. J. Booth and Company, Irving M. Scott being chief draftsman at this place. In these early days all the San Francisco foundries were engaged in mining work and repairs on Coast shipping. On August 30th, 1865, the first California-built locomotive was turned out and went on its trial trip from the Mission district of San Francisco to San Jose. The designs and drawings for this locomotive were made by Mr. Eckart.

In 1867 Mr. Eckart went East on a visit and while there was examined for and licensed as a first class chief engineer in the merchant service. Returning to San Francisco he resumed his relationship with H. J. Booth and Company designing mills and mining machinery. In 1869 he was appointed a draftsman to the Steam Engineering Department at the Mare Island Navy Yard. In the course of two years at the Navy Yard Mr. Eckart became foreman machinist and later superintendent of steam machinery through B. F. Isherwood's recommendation. During this period Mr. Eckart designed the steam machinery, propellers and dynamometers for experimental purposes on "Steam Launch Number Four," upon which boat an extensive series of experiments was made, the results of which were published in the transactions of the Institution of Naval Architects of London in 1872.

In 1871, Mr. Eckart left the navy yard to enter into partnership with Prescott, Scheidel and Company at the Marysville Foundry. The name of this firm was afterwards changed to Booth and Eckart. This foundry, being conveniently located to the mining districts, designed and manufactured a very extensive variety of hydraulic, milling and mining machinery. While there, Mr. Eckart contracted for and guaranteed a speed of 21 miles for the steamer "Meteor," built for the Carson Lumber Company and still used on Lake Tahoe. This was perhaps the fastest boat of her size built at that date.

In 1876 the firm of Prescott, Scott and Company, which succeeded the firm of H. J. Booth and Company, took some large contracts for pumping machinery for the Comstock and Mr. Eckart was called to San Francisco to superintend the construction and assist in the designing and erecting of these machines. The Sutro Tunnel was at this date in 15,500 feet and had 5,000 feet more to go and would pierce the Comstock Lode not lower than the 1,800-foot level. The mine owners already realized that nothing but the heaviest and best designed machinery would assist them on all the levels yet to be opened below the tunnel, and therefore, designs for pumps and hoists of large capacity, to reach over 4,500 feet below the surface, were decided upon and called for. Not only this, but the ventilation and sinking of the shafts in virgin ground, abounding in large but unknown quantities of warm and hot water, were something unparalleled in engineering experience in any part of the world.

In 1872, Mr. Eckart acted as consulting engineer for Adolf Sutro in the sinking of the four shafts he had started on the line of his tunnel and the information there gained stood him well in hand when the large pump and hoist orders came in 1876. He spent months experimenting and taking cards in the mines where the water would "boil an egg" and the vapors "air bound the pumps" and the expansion and contraction strains often wrecked the heaviest castings. In 1873 he moved to Virginia City and became consulting engineer to the Bonanza crowd, J. W. Mackay, J. C. Flood, J. J. O'Brien and James G. Fair, who owned or controlled nearly all the North End mines. At this time he was made manager of the Fulton Foundry. In October, 1878, he was appointed U. S. Deputy Mineral Surveyor for the State of Nevada. In 1880 he was appointed a member of the U. S. Geological Survey, under Clarence King, and was given charge of investigating and reporting upon the mechanical contrivances of the Comstock Lode. Nearly two years were spent in collecting data and making tests. Hydraulic indicators tested from 500 to 3,500 pounds per square inch were used on the hydraulic

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pumps. Chronographs to measure and record the velocities of engines and pump rods, accurate to the one five-hundredth part of a second, were used at the surface and at a depth of 2,300 feet. These observations proved of untold value in getting rid of "free vibrations" which had been so destructive to the long timber rods.

In 1881 the Risdon Iron Works installed and started on the 2,400-foot level of the Combination Shaft, a hydraulic pump operated from surface engines. From 900 to 1,000 pounds pressure per square inch was maintained in the surface accumulator, giving a working pressure on the pipes and pump at the 2,400-foot station equal to 4,700-foot head. Soon after these pumps started, power water was obtained from the pipe line of the Virginia City Water Company and the surface engine was discontinued. The underground pumps were then run as hydraulic engines and both power and mine water were discharged into Sutro Tunnel. In 1884 and 1885 additional pumps were put in on the 2,600 and 3,000-foot levels. At the lower pump the power water was received under 3,440-feet head, discharging the mine water under 1,420 feet lift. All of this engineering was of a pioneer class, as no similar conditions were known. Responsibility for the entire success of the installation was assumed and guaranteed by the builders and their engineers, Mr. Joseph Moore and Mr. G. W. Dickie. The high altitude of the Comstock mines added to the troubles from hot water, as the boiling temperature was but 202 degrees, and many men lost their lives while working around the pumps. The pump stations and drifts, although supplied with air from enormous fans, had an average temperature of 96 degrees and were nearly saturated with moisture. Ice in large quantities had to be supplied under ground and cooling stations for miners had to be erected before drifts could be run. However, the hot water and air, to a certain extent, were taken advantage of by the Comstock engineers and compound pumps and underground hoisting engines were designed to utilize the hot water and air of the mines in re-heating the compressed air used in the cylinders for pumping and hoisting, thus greatly increasing the efficiency of all underground machinery over what had been accomplished in other mines.

In 1880 deep mining began to decline and Mr. Eckart removed to San Francisco, opening offices as consulting and construction engineer. During the following ten years some very important mining plants were designed under his supervision. A notable example of his work were the Cornish pumps for the Ontario Mine. These pumps were 20 inches in diameter by 10 feet stroke, two pumps at each station, and operated from one pump rod 2,000 feet long. Other important mining work handled by Mr. Eckart were the hoists and reduction works of the Anaconda for Haggin and Tevis, the Geddes and Bertrand Mill in Nevada, the Sheep Ranch, Fine Gold and Kentucky Mills of California, the Daly Mills of Utah.

In 1890 Mr. Eckart was appointed consulting engineer to the Union Iron Works and in this connection helped to conduct the preliminary and official trial trips of the "Charleston," "San Francisco," "Oregon," "Olympia" and other vessels.

In 1899, Mr. Eckart was appointed consulting engineer to the Standard Electric Company and afterwards became their resident constructing engineer for their hydraulic works, including storage reservoirs, ditches, dams, flumes, pipe lines and power house installation. This was perhaps the first long distance, high potential, hydraulic transmission plant projected and was carried to a successful issue in 1903.

What manner of man Mr. Eckart was is summed up in the following written statement from his own hand: "Whatever successes I have achieved in a strenuous engineering life covering forty-five years of practice on the Pacific Coast, have been in a great measure due to a studious life, surrounded by an extensive collected engineering library of American and foreign books, and the appreciated assistance of associated engineers, together with the encouragement and loyalty of employers."

Mr. Eckart was affiliated with the following engineering societies: American Society of Civil Engineers, 1881; American Society of Mechanical Engineers, 1882, vice-president 1883-1885; the Institution of Mechanical Engineers of London, 1878; Society of Naval Architects and Marine Engineers, 1893; associate member the Institution of Naval Architects of London.

WILLIAM McKENZIE.

On January 14th occurred the death of William McKenzie, one of the outstanding figures in the early marine history of San Francisco Bay. Mr. McKenzie entered the service of the old Central Pacific Railroad in 1873 as a machinist. He was soon foreman at the Sacramento shops. In 1875 he was transferred to Terrance, Utah, as master mechanic, and in 1879 he came west again and took up similar duties in Oakland. In 1889 he was made master mechanic of the Southern Pacific Railroad and in 1902 he was appointed to the superintendency of the ferry and river steamers of the Southern Pacific system. This position he held continuously till his death and was actively employed up till within two months of the end.

Undoubtedly the two works which will always be looked upon as being the children of Mr. McKenzie's genius as a mechanic and builder are the giant car ferries "Solano" and "Contra Costa." These are the largest ferries ever constructed and probably the largest wooden hulls ever attempted.

The big, gruff, kindly superintendent of ferry and river steamers was known and appreciated from one end of the Coast to the other and many stories are told of his quick witted replies to questioners. On one occasion, when he was only a short time in the service of the railroad, a high official noticed him carefully scrutinizing the valve gear on a locomotive. "Are you a mechanic?" inquired the official. "No sir, I'm a McKenzie," came back the reply.

On another occasion Dr. McKenzie, a Presbyterian divine in San Francisco, was introduced to the superintendent of the railroad's floating property. The minister was slightly inclined to be pompous and addressed the layman as follows:

"I see Mr. McKenzie that we have the same name, no doubt we both belong to the great Clan McKenzie."

"No doubt of it, sir."

"It may be," resumed the divine, "that we are relatives."

"I don't know about that, doctor. Were your relatives with Noah in the Ark?"

This rather staggered the doctor, but he came back strong with: "Why, Mr. McKenzie, I have no doubt that they were."

"You are no relative of mine then. My people had a boat of their own."

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Marine Feed-Water Heaters, Closed Type

By C. F. BRAUN.

Of the heat economizing auxiliary apparatus for a steam vessel power plant, the most important, next to the condensing equipment, is the feed-water heater. In addition to recovering and returning to the boiler approximately 11% of the total heat generated, thus saving fuel and increasing the steam capacity of the boiler, it also relieves the portions of the boiler near the feed inlet from injurious temperature strains. But it is a fact that engineers give very little attention to the mechanical fitness of this apparatus, and much less to its thermal efficiency. It is the purpose of this article to point out a few of the fundamental principles of design, describe rational ratings, and analyze various mechanical constructions, as an aid to the engineer in making better selections of this important apparatus.

The primary function of a feed-water heater is to continuously transmit heat from steam to water, raising the temperature of water as nearly as possible to that of the steam.

The factors which effect this transfer of heat are:

1. The temperature difference or head between the steam and the water.
2. The arrangement of heating surfaces.
3. The loss of heat by radiation, conduction, or convection.
4. The coefficient of heat transmission of the dividing surface, which is dependent on
   (a) The conductivity of the metal used;
   (b) The condition of the surfaces;
   (c) The velocity of the water;
   (d) The amount of air present in the heater, and
   (e) The design and shape of the heating surfaces.

Temperature Difference.

It has been repeatedly proven by various experimenters that the transfer of heat from a hot fluid to a colder one through metallic surfaces is directly proportional to the difference of temperature existing between them. But in a feed-water heater the temperatures of the fluids are not the same at all parts of the surface, that of the water varying from say 50° F. at entrance to say 207° F. at exit, and that of the steam from say 212° at entrance to 208°, or even lower, in remote parts of the heater where the steam pressure is reduced.

For purposes of computation, only one value can be used, and it is therefore necessary to determine a mean or average value. In order to compute this mean value for heaters it is sufficiently accurate to disregard the small variations in the temperature of the steam throughout the heater and to use that of the entering steam only. A simple arithmetic mean is not correct, and the formula which has been almost universally adopted and by repeated experiments proved as very accurate is

$$D = \frac{T_2 - T_1}{\text{Log.}_e \frac{Ts - T_1}{Ts - T_2}}$$

in which

D = Mean Temperature difference
T_1 = Initial temperature of the water
T_2 = Final temperature of the water
Ts = Temperature of the steam.

This formula is somewhat unhandy for frequent use, but the writer has developed a curve chart, Fig. 1, which makes its solution only a matter of direct reading from the chart. This chart is plotted in three variables for the determination of mean temperature difference according to Grashof's formula which contains four variables. This is accomplished by utilizing the fact that the value of the mean temperature difference will not be changed if any constant be deducted from all the temperature values in the equation. By making this constant T_1 the equation is simplified to one of three variables which are plotted on this diagram. To increase the accuracy of range of the diagram, two scales are given. For temperatures between 200° and 1000° the 100 scale should be used.

Since the heat required to raise the temperature of water 1° F. is practically constant at all temperatures, namely, 1 B.t.u., it will be observed that the upper degrees of temperature given to the feed water require relatively much more heater capacity than do the lower degrees. As an example, with steam at a temperature of 212° F. it will require a heater of the same size to raise the temperature of water from 184° F. to 207° F. as it would from 50° to 184°, although in the latter case eight times as many heat units are transferred as there are in the former. The explanation lies, of course, in the values of the mean temperature difference, which figure for the former case 15° F. and the latter 100° F. Expressing it another way, a heater capable of raising the temperature of a given quantity of water from 50° F. to 207° F. must be twice as large as one required to raise the temperature from 50° F. to 184° F.

Arrangement of Heating Surfaces.

The arrangement of heating surfaces has an important direct effect upon the transfer of heat, for a poor spacing of the various parts may cause serious reductions in steam pressure in parts of the heater remote from the steam inlet with corresponding reductions in temperatures. It has also important indirect effects by influ-

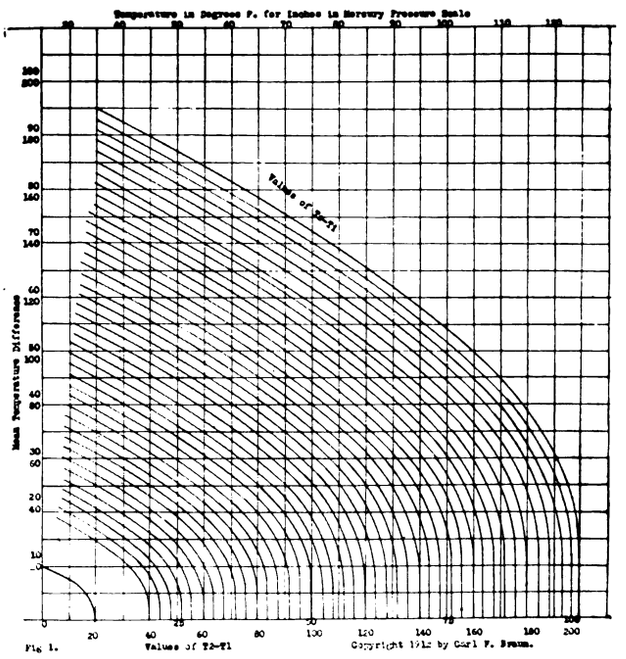


Fig. 1. Mean temperature difference chart.

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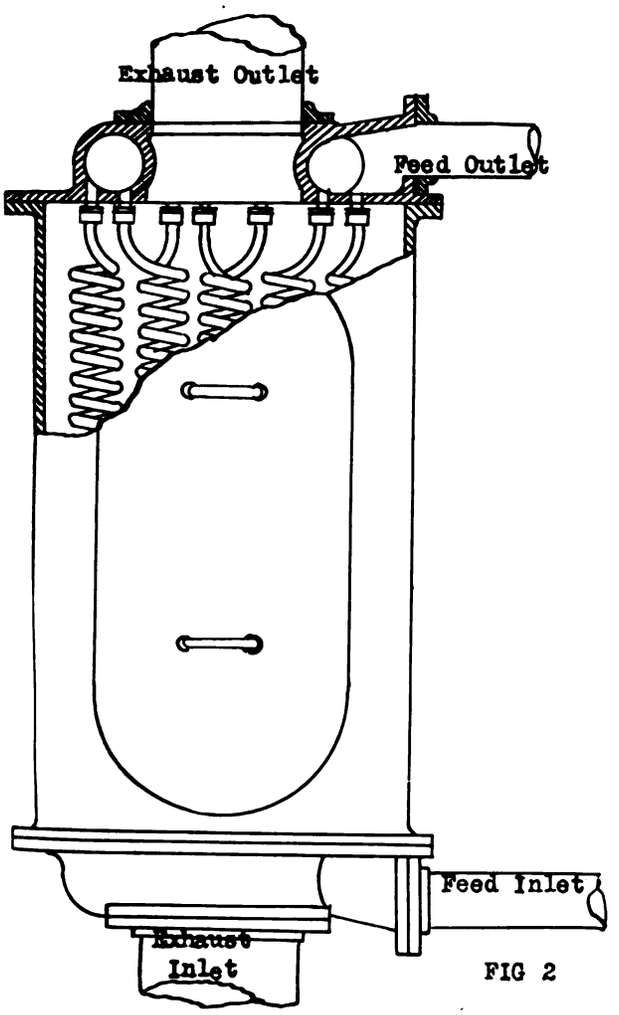


Fig. 2. Multicoil heater with removable tubes.

encing the mean temperature difference, the coefficient of heat transmission, and the losses by radiation.

It may also produce a condition undesirable for the operation of other apparatus in the plant, that is, back pressure on the exhaust.

Loss of Heat by Radiation.

A metal feed water heater containing steam and water at a temperature considerably above that of the surrounding air constitutes an excellent radiator. This radiation is objectionable because heat units are wasted which may often be used profitably otherwise, and also because it results in uncomfortable engine or boiler room temperatures.

Coefficient of Heat Transmission.

The coefficient of heat transmission is that figure which represents the number of heat units (B.t.u.) which will pass in unit time (1 hour), through unit area of surface (1 sq. ft.), per unit difference of temperature or temperature head (1° F.), from a warmer fluid to a colder one. A knowledge of the value of this coefficient is absolutely necessary for the computation of heating surfaces, and the many experiments which have been made, while showing wide variations in magnitude, have nevertheless clearly demonstrated the determining factors together with their approximate degree of effect.

Conductivity of Metal Surface.—Certain metals are much better conductors of heat than others, copper standing at the head among those commercially available. Regardless of the material of the heating surface, this conductivity rapidly decreases with increase in the thickness of the metal.

Conditon of Surface.—Nearly all natural waters contain in solution, chemicals such as lime, or sand, clay, organic and other matters in mechanical suspension, and in power plants the steam and water may contain considerable quantities of oil. These all tend to adhere to and bake on the hot surfaces, causing the formation of coatings which greatly retard heat transmission. Even very thin coatings, may reduce the coefficient by one-half

Velocity of Flow.—The transfer of heat from water to any type of surface is very largely dependent on the velocity of flow, it varying within certain limits almost directly as the velocity. This is explained as follows: Water itself is a very poor conductor of heat; that is, it has a low conductivity, so that the particles of water in contact with the heating surfaces at any instant will transmit very little heat to other particles next to them. Heating is really accomplished by continually removing the heated particles from the surface and bringing new ones to take their places. And the higher the velocity the more rapid is this exchange of particles.

Design and Shape of the Surface.—The rapid removal of heated particles of water from the hot surfaces and their replacement by cooler ones, is influenced considerably by the design and shape of the heating surfaces. Small passages, and passages of irregular shape result in high surface velocities and increase this transference of particles.

The design of heating surfaces has also minor indirect effects on the coefficient of heat transmission by

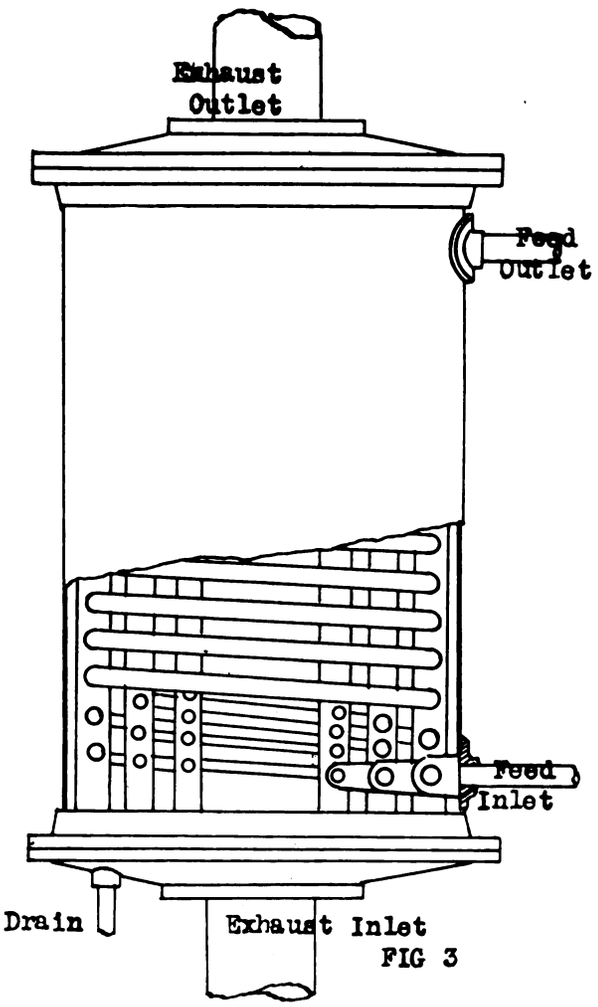


Fig. 3. Multicoil heater with non-removable tubes.

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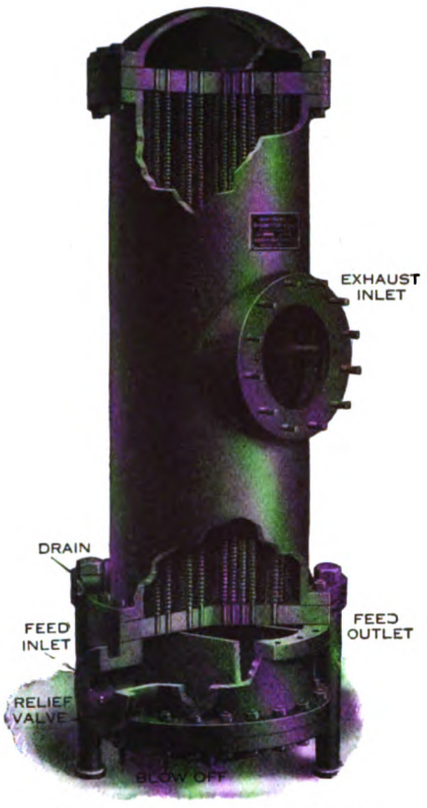


Fig. 4. Corrugated tube heater.

influencing thickness of metal surfaces, condition of surfaces, and velocities of flow.

Having considered the various factors which influence the transfer of heat, we will analyze a few typical commercial constructions with regard to heat transfer, commercial practicability, mechanical fitness, reliability, ease of cleaning and life.

Types.

For manifest reasons of economical construction, practically all heaters consist of a cylindrical shell containing coils or other arrangement of round tubing. Either the steam or the water may be passed through the tubes, the other substance being on the outside and in contact with the walls of the shell; and depending on this arrangement, heaters naturally fall into two general classes of steam tube or of water tube, taking the name of the fluid within the coils or tubes.

Heaters of the steam tube type have long ago been proven theoretically and practically inferior to the water-tube type, and do not have any place in this discussion. But in order to point out clearly the various objections, Fig. 6, showing a common type, is presented for consideration. The most serious difficulty is that the water being in a large body, has an exceedingly low velocity of flow, the only circulation being a sluggish movement due to the rise of hot water to the top by reason of its lower specific gravity.

It is also very difficult to produce a free circulation of steam, quick removal of air, and thorough drainage of condensation from the small coils or tubes, hence the pressure, and consequently the temperature of the steam, will fall very materially toward the end of the coils. For the above reasons, the co-efficient of heat transmission is very low, ranging from 150 in poorly designed apparatus to say 400 in the best types, or about two-thirds that in a well designed water tube heater.

And if the water contains scale forming solids, these will on account of the low water velocity deposit readily on the outside of the tubes, and further reduce the heat transmission.

The next serious objection to this type of heater is that it will not permit of high exit temperatures because the hottest water is continually being intermingled with currents of cooler water. And finally the shell is under water pressure (boiler pressure plus pipe friction) amounting often to 250 lb. per sq. inch. This leads to the use of steel for shells instead of cast iron, on account of its much greater tensile strength. Steel is not desirable for heater work for it is attacked and rapidly damaged by the gases driven off from even distilled water at a temperature of about 180° F. Steam tube heaters, it therefore appears, do not fulfil one of the requisites of good design as well as water tube heaters and they are therefore used only where storage is required. Even for this service a water tube heater with independent storage tank is equally as good.

Having now eliminated the steam tube heater we will consider various ways of increasing the heat transfer factor in water tube heaters.

Temperature Difference.

The first of these factors discussed, mean temperature difference, can be affected only by the arrangement of

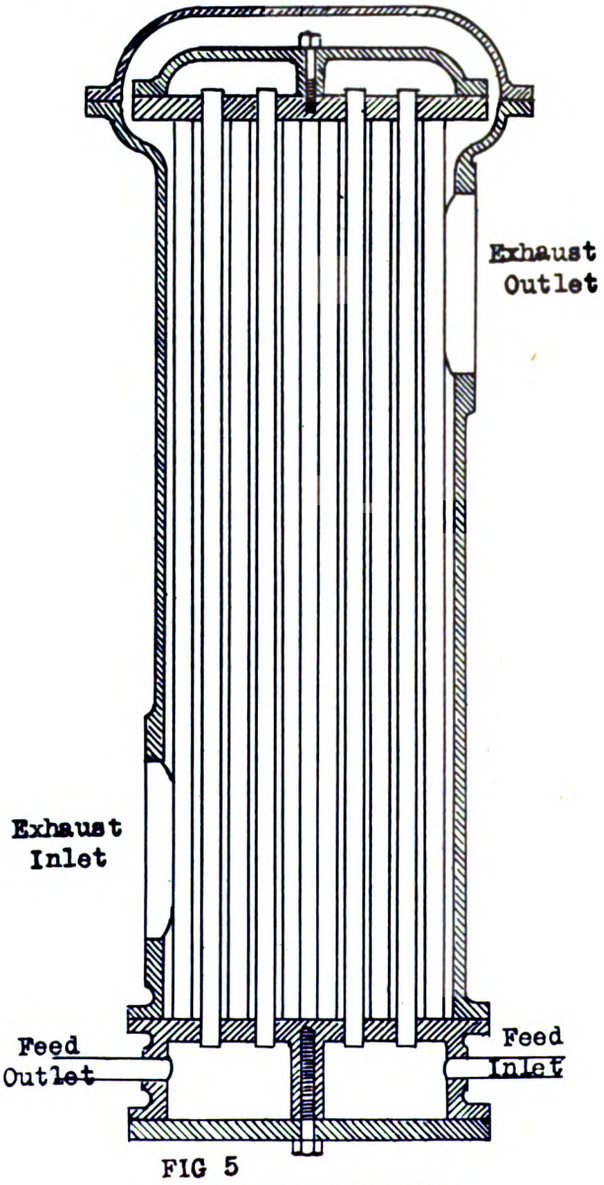


Fig. 5. Floating head heater.

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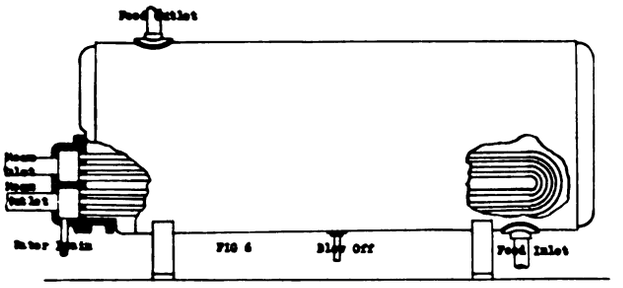


Fig. 6. Steam tube storage heater.

heating surfaces. For maximum mean temperature differences the surfaces must be arranged so as to give counter current flow, that is, the steam is passed through the heater in an opposite direction to that of the water, the hot water leaving where the steam is hottest.

It can be seen at once that by this arrangement the highest final water temperature can be obtained, and it can readily be demonstrated mathematically that with any given set of temperature values a greater mean temperature difference may be obtained than is possible with parallel current apparatus. For the above reasons, heating apparatus should always be constructed on the counter current principle, and never with parallel currents.

Figs. 2 and 3 show modern well known types of heaters in which this principle is neglected entirely and which, therefore, cannot possibly give high feed temperatures unless a large excess quantity of exhaust steam is passed through the heater. Heaters Figs. 4, 5 and 8 have this principle correctly carried out.

Arrangement of Heating Surface.

The next requisite of good design is proper arrangement of heating surface so as to give unrestricted distribution of steam throughout the heater. For economical manufacture it is desirable to have as much heating surface in a given size shell as possible. This at once calls for the use of straight tubes of as small diameter as practical and arranged close to one another. A coil heater is the most objectionable as regards this feature.

But if some provision is not made for distribution of steam, this close spacing of tubes will prevent the entry of steam to all parts of the heater and only those tubes directly in front of the exhaust opening will be operating efficiently. The surface should therefore be arranged with free spaces leading to those parts of the heater away from the entrance; such an arrangement can be seen on the heaters shown in Fig. 4 and Fig. 8 but is absolutely neglected in those shown in Figs. 5 and 7.

A steam distributing dome, Fig. 8, should always be provided to reduce the velocity of the entering steam and to distribute it over the entire length of the tubes. Otherwise air may stagnate at the ends rendering those portions of the surface feeble or ineffective.

Co-efficient of Heat Transmission.

Conductivity of Metals.—The most obvious item to look to in an effort to increase the heat co-efficient is the material for the heating surfaces. As we have seen, copper has the highest conductivity of metals commercially available for this purpose, and in addition to this is, when properly alloyed, not attacked by and corroded by minerals in the water or by electrolysis, or by air in the steam, so that comparatively thin walls may be used. For this reason copper alloys are invariably used for the heating surfaces.

Condition of Surface.—Practically any type of heating surface will eventually become coated with impurities in the water and for this reason the heating surface should invariably be arranged for easy cleaning. This at once eliminates from consideration any bent or coiled tube, and the writer has actually seen heaters similar to Figs. 3 and 7, which had been discarded owing to the fact that they had become clogged with scale which it was impossible to remove. It is as foolish to use coiled tube heaters as it would be to use coiled tube boilers.

And even many straight tube heaters are constructed so that it is very difficult to expose the ends of the tubes for inserting a cleaning tool. Heater Fig. 7 has large piping connections in the heads which must be disconnected and removed before cleaning can be accomplished. Heaters Figs. 4, 5 and 8 are constructed properly so that the heater heads may be removed and

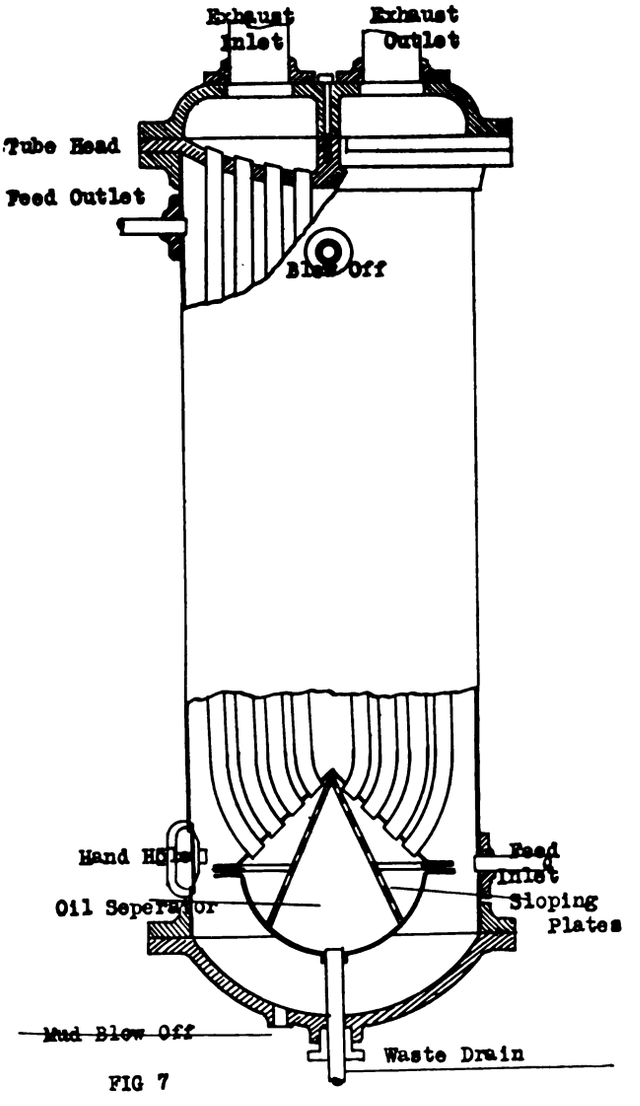


Fig. 7. Steam tube heater without storage.

tube ends exposed without the disconnecting of any piping. The deposit of scale may be greatly decreased by having a high water velocity through the heater, and this fact alone warrants the use of small tubes and several passes of the water, and is in fact a much more important consideration than is generally thought.

Any tube having an irregular passage such as a corrugated tube, Fig. 10, produces high local velocities with consequent scouring action and reduction of scaling. The same effect may be secured in plain, straight

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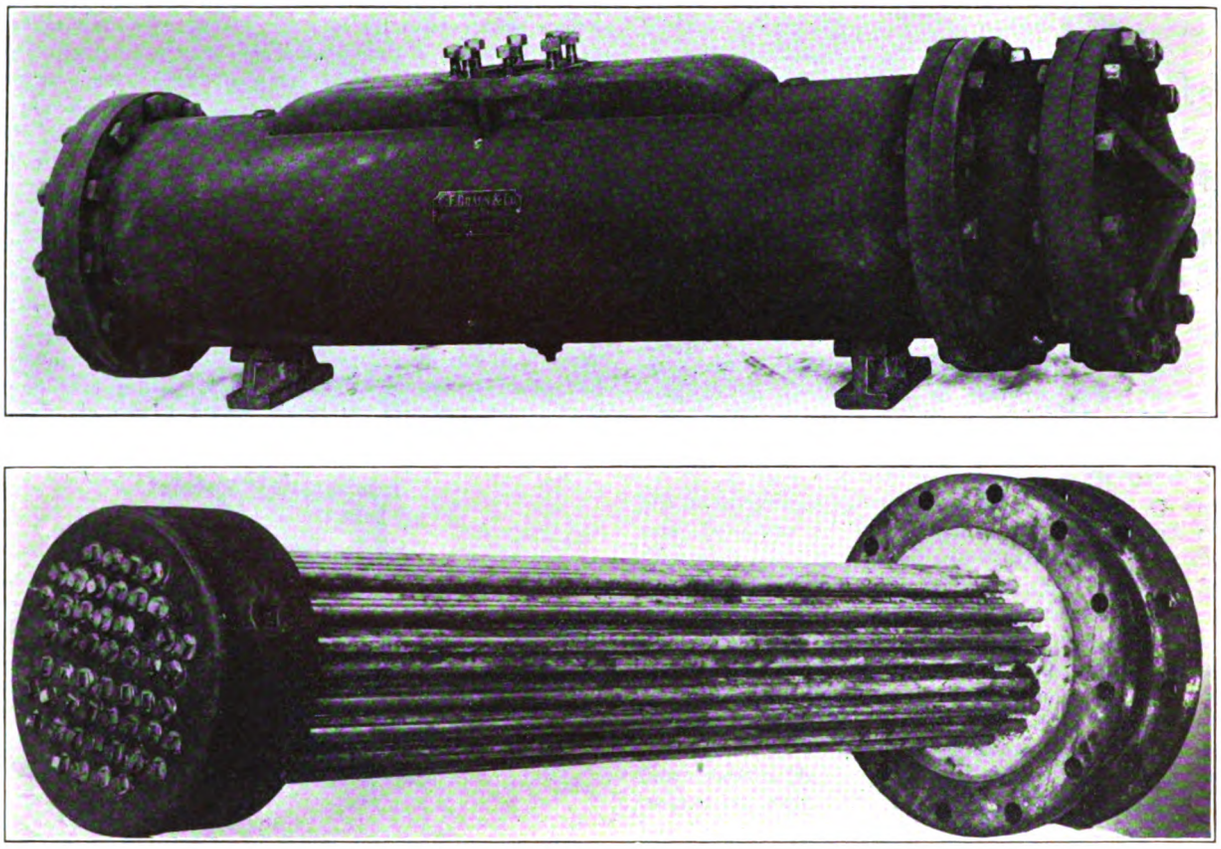


Fig. 8. Floating head heater with removable heating element.

tubes by the use of proper agitators, Fig. 9 showing a simple type.

As exhaust steam, particularly that from small auxiliary engines, nearly always carries considerable quantities of oil and possibly other impurities, the outside of the heater tubes will eventually become covered with a very effective insulating coating of these materials, which is difficult to remove. A correct heater design should therefore provide for the easy and effective cleaning of the outside of the tubes as well as the inside. Heater Fig. 8 having provision for the removal of the entire heating element fulfills this important requirement, but heaters Figs. 3, 4, 5, 6 and 7 have no provision whatever. Heater Fig. 2 has the tubes secured by screw unions so that they can be removed individually and cleaned, but it is impossible to clean the inside of the tubes which is a far more serious consideration.

Velocity of Flow.—The most important factor affecting the co-efficient of heat transmission is the velocity of water flow through the tubes, for, eliminating other factors, the co-efficient increases directly as the velocity. High velocity is obtained by the use of small tubes, and by causing the water to pass successively through groups of tubes by means of baffling partitions in the water spaces. The increase in the co-efficient with increase of velocity is due to the rapid removal from the heating surface of heated particles of water and their replacement with colder ones. But, if the tube is large, even with high velocities there is a tendency for the particles of water near the heating surface to remain there, and a colder core of water be maintained in the centre of the tube, for water is an excellent non-conductor of heat. It is, therefore, essential to construct the surface of small tubes.

A feed water heater, unlike a condenser, heats through a large range a comparatively small quantity of water so that the amount of surface per given quantity of water is comparatively great. For this reason it is necessary, in order to obtain the desired high water velocity, to construct the heater to give several passes of the water, the water channel portions for which occupy available tube space on the tube sheet. Furthermore friction losses may become excessive, owing to the multiplication of tube entrance loss. For this reason various effective methods have been devised for producing high local surface velocities.

One of the methods employed is to coil the tube, as in Fig. 2, thus giving to the water a twisting motion. But this has very little effect, producng only a slow turning motion of the water and increasing the co-efficient by probably not more than 3 or 4 per cent. And the coiled tube is most objectionable because it cannot be cleaned, and because it occupies too much space in a shell. Another method which has been adopted is to use a double tube construction by means of which a thin film of water is maintained and heat applied to both sides. This method produces very effective results, but the construction is not a simple one, the tubes are difficult to clean, and the actual efficiency of the inner steam tube is so low as not to warrant its cost.

Another method much in use is to corrugate the tube Fig. 10, thus giving to the water a twisting motion. This method is very effective, producing high rates of heat transmission with comparatively low velocities. The simplest method and a very effective one is to use some form of agitator in a straight tube, a coiled wire, Fig. 9, or a twisted strip of flat iron having a width equal to the inside diameter of the tube being well known commercial types.

A Few Guiding Figures.

There is available much experimental data showing the effects of velocity, and of the size, material, and type

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of tube on the co-efficient of heat transmission, the discussion of which is beyond the scope of this article.

In well designed apparatus having small tubes, of considerable length, heat transmissions of 600 to 700 B. T. U. per square foot per degree difference may be safely attained without producing prohibitive water friction losses, but thorough knowledge and the most careful consideration of the principles of heat transfer and of friction are necessary.

For safe commercial design and to allow for coating of the surfaces these figures should be decreased by say from 20 to 30%. With incorrect velocities, large tubes, or improper steam distribution, these figures may easily be reduced by one-half.

Provision for Expansion.

Since a heater is an apparatus without moving parts it will, if constructed properly, require practically no attention. But owing to the difference of temperatures to which the various metal parts of the heater are subjected, it is necessary to provide means for compensating for the differences in expansion of these parts.

The coiled tube (Fig. 2) will, of course, accommodate any expansion strains but in order to have it removable for replacing, it is constructed with unions at each end. This introduces a perishable part and one which may also jar loose due to vibrations of a ship's engine, or pulsations of the boiler feed pump. These objections, coupled with the fact that it cannot be properly cleaned, make the coiled tube the least desirable of all.

The U tube, Fig. 6, is used to some extent and will properly accommodate expansion, but it cannot be cleaned, is difficult to remove, and occupies more space than a straight tube.

The above methods of accommodating expansion by coiling, U bending, or otherwise shaping tubes, do not, however, enter consideration in good design, for such types of tubing are for other reasons undesirable, namely, impracticability of cleaning, difficulty of obtaining renewals readily and promptly, difficulty of installing, etc., as previously discussed. For this reason many methods have been devised for accommodating expansion with straight tubes.

An early method was to construct one of the heads as a diaphragm, expanding the tubes rigidly into each head. Due to the unequal stresses, the diaphragm head was sure to fail and this method has now been mostly abandoned.

Another somewhat similar arrangement used to a limited extent is to place a copper expansion joint in the shell. This, however, is little better than the diaphragm head as the copper joint depending on ductility for action is sure to fatigue and crack.

A simple arrangement which permits of expanding the tubes rigidly into fixed tube sheets is that of bowing the tubes slightly say one or two inches, so that expansion is accommodated independently in each tube by further bowing. It is probable, however, that the bowing will eventually cause the tubes to crack.

The corrugated tube is supposed by many to accommodate expansion in the corrugations and the manufacturers of the corrugated tube expand both ends rigidly into fixed heads. The action, however, is really that of bowing which is assisted by the fact that the corrugations cause the tube to be quite flexible.

A very common and effective method, of course, is to secure straight tubes into the tube sheets by means of packings and ferrules, the only objection being the introduction of perishable packing which will eventually leak. This may be largely avoided by the use of good fibre packings, but this method should not be used on any heater using steam much above atmospheric pressure.

A modification of this is to expand the tube rigidly in one head securing at one end only with fibre packings and screw ferrules. This prevents any possible moving or turning of the tube, and if a parallel expander be used does not make them difficult to remove.

Probably the best device is the floating head, Fig. 5 or 8, which permits of expanding the tube rigidly at both ends with the consequent elimination of perishable parts and the possibilities of leaks.

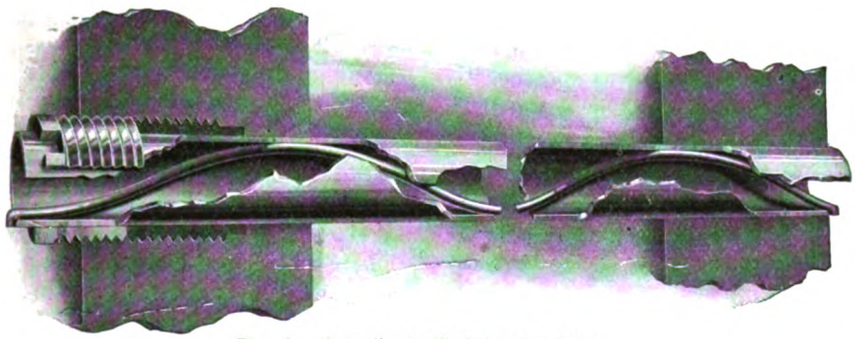


Fig. 9. Spirally baffled heater tube.

General Structural Features.

The heater should always be constructed with the tube heads and water channels separate casting from the heater body (Figs. 4 and 8), so that in case of cracking they can be easily replaced. Fig. 12 shows a poor design in which a cracked head necessitates the replacing of the entire shell.

Materials.

For heating surface a metal is required having a high conductivity for heat. The metal must also be resistant to corrosive attacks of chemicals in the water and must be strong enough to make a stiff tube which will not sag unduly. Copper properly alloyed fulfills both of these requirements, being far superior to iron or steel which pit or corrode rapidly. Heater shells should invariably be constructed of cast iron for it is not subject to pitting and will last almost indefinitely. Steel shells may possibly lighten the heater, but they are subject to very rapid corrosion and should be avoided even for marine service.

Piping.

The general method of arrangement of feed water heater piping connections has been and remains to-day, with few exceptions, fundamentally wrong. The writer refers to the thoroughfare method (Fig. 12), in which the heater is placed in the exhaust header and all exhaust

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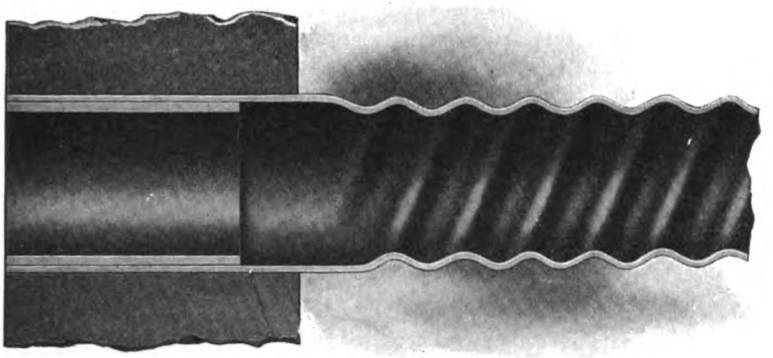


Fig. 10. Corrugated tube.

steam passed through the heater, excepting, of course, that which is condensed in the heater. In non-condensing plants the total exhaust steam is about ten times as much as is required by the feed water heaters, and in condensing plants often two to four times as much. Thus the piping to the heater and the heater shell itself must be large enough to accommodate the maximum total exhaust of the power plant.

Usually this piping is installed too small and the heater passages not designed for passing large quantities of steam, and the result is an excessive back pressure on the various steam units. Furthermore this large quantity of steam passing at high velocity through the heater often causes the tubes to chatter and consequently crack off, and if there is oil in the exhaust the tubes will foul quickly. If a by-pass is provided to permit of cutting the heater out for cleaning, a number of heavy fittings and three valves are required, all the size of the main exhaust.

All these difficulties may be obviated by connecting the heater on the "induction" principle, similar to the way in which all condensers are connected, so that the heater will condense all steam entering it and draw more as required, the main body of the exhaust passing to atmosphere without passing through the heater. This arrangement is shown in Fig. 13 as adopted by one of the more progressive manufacturers. So deep rooted was the old "thoroughfare" principle in the minds of engineers, that blanking off one of the openings in their old pattern was not sufficient, and they had finally to change their patterns to have only one opening.

This induction principle of piping makes possible smaller piping to the heater, a more convenient location of the heater (not necessary in main exhaust) the isolation of the heater by one valve, and protection of tubes from dirt and "chattering." Precaution should be taken to locate the heater branch in the line of flow (Fig. 13) and no back pressure valve is then necessary.

The exhaust connection should be near the centre of the shell to give even distribution throughout the shell, there should be blow-off connections in each pass, there should be a drain connection to trap at the lowest part of the steam space, there should be liberal air vent connections to prevent the heater from becoming air bound, and above all there should be no piping connections in the heads to interfere with cleaning.

Ratings.

The feed water heater, like much other apparatus, is subject to irrational and meaningless ratings, namely, by horse-power. This presumably refers to boiler horse-power usually taken as the evaporation of 30 lb. water per hour, so that a one horse-power heater would be one capable of heating water at the rate of 30 lb. per hour. But the writer has known unscrupulous venders of heaters, who, when shown that the performance of their heaters did not come up to guarantees, gave the excuse that they in rating meant engine horse-power, which, of course, means nothing, and may range from say 10 lbs. to 100 lbs. per hour.

Even if the quantity is fixed at 30 lb. per hour there are still the temperatures which are not considered in the horse-power rating. As the temperature of water entering the heater may be anywhere from 32° F. to, say, 110° F., and as the temperature of the water leaving may be anything above this depending on the capacity of the heater, it is obvious that the horse-power rating has no definite meaning whatever and it is true that many heaters do not produce a final water temperature of over 160°, whereas it should be nearly the temperature of the exhaust steam, or not less than say 207° F. in any case.

Some engineers recognizing the insufficiency of the horse-power rating have adopted the method of specifying the square feet of heating surface. This, of course, is more satisfactory than the horse-power rating, for if the engineer is careful to select a good heater he will, with sufficient heating surface, obtain results. If he should select a parallel current heater, that is, one in

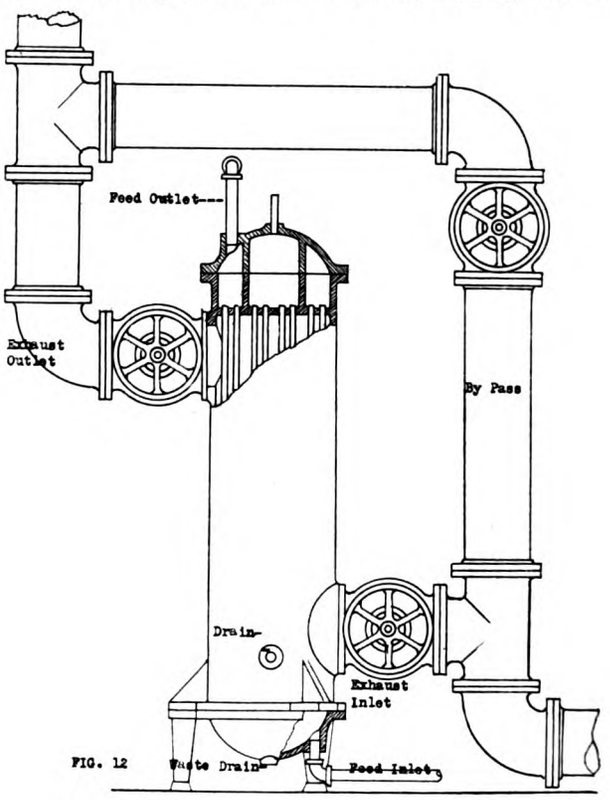


Fig. 12. Heater with "thoroughfare" piping.

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which the feed water leaves the heater on the side away from the exhaust inlet, he could not with any amount of surface obtain a high temperature without a great excess of steam.

As a competitive basis the square feet of heating surface is not in any way fair. The design and general arrangement of the heaters may cause a variation in heat transmission of 200% or 300%, and, as has been described previously, the use of special types of heating surface such as tubes equipped with agitators may increase the heat transmission 20 to 50%, even with the other features of design unchanged. The establishment by purchaser of the square feet of heating surface as the competitive basis only discourages any improvements in design and secures for him a shell with some tubes in it, which may or may not be a feed water heater.

The only practical, rational way to rate a feed water heater is according to its requirements, namely, to raise the temperature of a given quantity of water from some known initial temperature to as near that of the exhaust steam as is practicable. It has been found by experience that with a properly designed feed-water heater the feed water can be delivered at a temperature not less than 5° below that of the exhaust steam, and without excessive heating surface, say one-third to one-fourth square feet per 30 lb. water per hour. This, then, is what the engineer should demand and not be satisfied with some lesser temperature, but the writer's observations are that in about one installation in fifty does the feed water temperature reach the 5° difference.

Let us assume that the total evaporation of the boiler is 30,000 lbs. per hour and that the temperature of the feed water supply is 50° F., and that a back pressure of one pound gauge is maintained on the auxiliary exhaust line to exclude air, which are average figures. Specifications for a feed water heater for these conditions should require that the heater be capable of riasing the temperature of water from 50° F. to not less than 210° F. at the rate of 30,000 lbs. per hour when supplied with all exhaust steam that the heater will condense at one pound gauge, corresponding to a temperature of 215°.

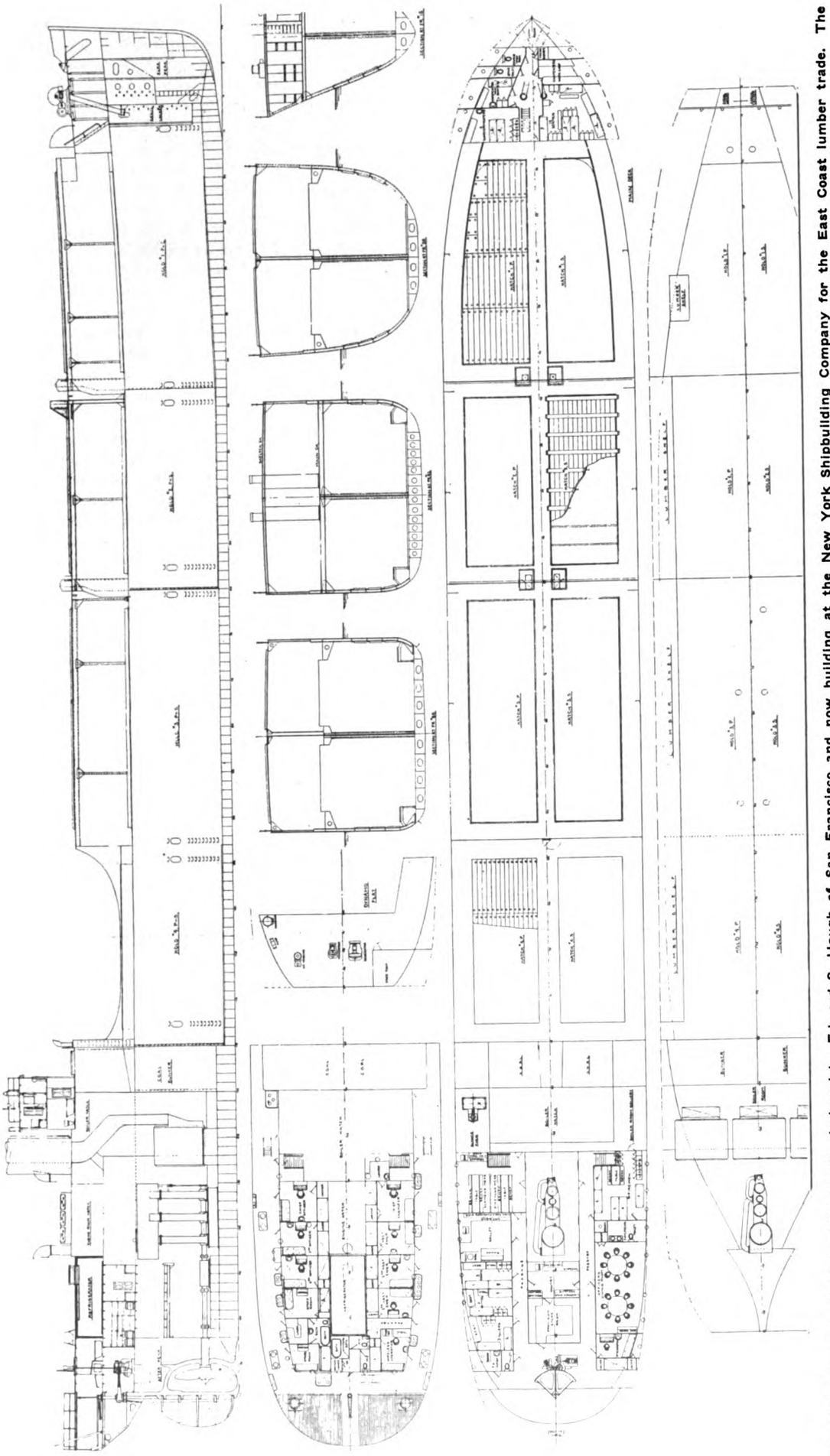
The last clause is a very important one, otherwise unscrupulous bidders will guarantee a final water temperature of 210° or higher and if test is made will demand a back pressure of several pounds. The writer had personal experience with just such an instance. Of course, if there is a back pressure with correspondingly increased steam temperature, the final temperature of the water should be correspondingly higher, in fact, not more than 5° below the steam temperature.

Of course any heater must be supplied with sufficient steam to furnish the heat for the water, but as there are available for heating the water about 1000 B. T. U. per



The "Star of Lapland" under way. Photo by George Miller, San Francisco.

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General arrangement of lumber steamer designed by Edward S. Hough of San Francisco and now building at the New York Shipbuilding Company for the East Coast lumber trade. The vessel is specially adapted to the handling of "unit" cargoes, a system of lumber handling originated and perfected on this coast.

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pound of steam, each pound will raise the temperature of say 10 lbs. water 100° F. As the steam consumption of auxiliaries about a plant is seldom less than 15% of the total this alone will, in nearly all cases, furnish an ample supply for the heater.

Another factor which should not be overlooked is the mechanical energy required for forcing the water through the heaters. This, in good designs, is almost negligable amounting to only say 5% of the total work required of the feed pumps. But with careless design or one involving the use of double tubes, the frictional resistance may be so high as to materially burden the feed pumps. A heater rating should, therefore, include the frictional resistance to flow of the water.

Lumber Carrying on the Atlantic

IN THIS issue we illustrate the plans of a steamer now completing at the yards of the New York Shipbuilding Company, of Camden, New Jersey, for the Carpenter-O'Brien Company, of Jacksonville, Florida.

This concern is now building extensive mills at Jacksonville and in the very near future will put on the market large supplies of southern lumber suited to the Atlantic Coast and interior markets. The steamer illustrated is the first of three, all of which will be steadily employed between Jacksonville and New York.

Each steamer is designed to carry 3,000,000 board feet in units, about one-half of which will be finished dry kiln stock in every form and ready for market. The plan of stowage, loading and discharging is that introduced and perfected on the Pacific Coast by the C. A. Smith Lumber Company, the pioneers of this method of stowage and delivery in the lumber trade. The lumber is carried in units four feet square and the unit or package may be made up of any size of material, all the stock being graded at the mill and delivered in this form to the customer. The units will weigh up to eight tons each and will have their slings in place until delivery at their destination. By this means the speed of loading or discharging is only limited by the speed of the cranes or winches and the rapidity with which the slings can be hooked on for hoisting or lowering into the hold of the vessel. The holds and hatches are all so arranged that each unit will be lowered directly into its place.

At the Jacksonville mills there is a special covered slip into which the vessels will enter bow on. Overhead gantry cranes traveling the length of the wharf will load the ship; there being no other labor employed than the attendants who operate the cranes and handle the crane hooks. At the New York yard there will be a similar covered slip and gantry cranes for discharging. One of these vessels will load a full cargo in twenty hours and discharge it in eighteen hours. Each ship will deliver 3,000,000 feet board measure to the New York yard per trip and will make three trips per month.

For local distribution of the products from the Carpenter-O'Brien mills there will be specially constructed barges and tugs. These will load at the New York yard and deliver by their own appliances at any wharf where five feet of water is to be had.

It will be seen from the plans published herewith that these lumber steamers are a departure from what may be termed standard practice. All structural details exceed the United States requirements and the Classification Societies' rules. The sheer strake is carried up thus adding great strength to the topsides. There is a longitudinal bulkhead on the center line extending from the fore peak to the boiler room bulkhead. There are two intermediate transverse bulkheads in the hold spaces, thus dividing the space below the main deck into six holds. Hold number two serves as a deep ballast tank when the vessel is light, rapid filling and discharging being effected by a turbo-driven centrifugal pump located in the engine room. There is also a subdivided trimming tank under hold number three. Above the main deck there is a continuous tween decks 182 feet in length.

The machinery consists of a triple expansion engine with cylinders 24½", 38½" and 67", and a stroke of 45". The condenser is independent of the engine framing. Steam is supplied by three Scotch marine boilers working under Howden's forced draft. The living quarters for both officers and crew are very commodious, only the deck crew being berthed forward.

The Carpenter-O'Brien enterprise would appear to be the most complete of its kind in the country, but it has to be admitted that the Pacific Coast supplied the practice upon which the scheme is worked out. The type of construction employed on these steamers has been patented by Mr. Edward S. Hough, of San Francisco, who designed the steamers and also the craft to be used for local deliveries and who is now superintending their construction.

Launch of the Belgenland

THE launch of this fine, large passenger steamer by Messrs. Harland & Wolff, Ltd., at Belfast on the 31st December, is a significant indication of the faith of the managers of the line in the restoration of Antwerp to its former position in the commerce between Europe and America. The retention of the name "Belgenland" for the steamer and "Antwerp" as the port of registry, notwithstanding the present position of affairs, may be regarded as the prophetic and even defiant answer of commercial enterprise and knowledge to the unwarranted act of aggression that has temporarily closed the commerce of one of the great ports of the world. We look forward confidently to the time when the "Belgenland," one of the largest and most efficient instruments of commerce, shall enter Antwerp as the harbinger of peace and coming prosperity.

The "Belgenland" is a triple screw passenger steamer about 700 feet long and 78 feet beam, with a gross tonnage of approximately 27,000 tons and 33,000 tons displacement She has been constructed on the latest and most approved principles, the double bottom extending right fore and aft and the watertight bulkheads carried up to the awning deck. There are seven steel decks besides the orlop deck and the bridge deck.

The "Belgenland" will have accommodation for 660 first-class, 350 second-class and over 2,000 third-class

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passengers, the first-class accommodation including a number of cabins-de-luxe on the bridge deck. In addition to the usual first-class dining saloon and reception room, reading and writing room, lounge, and smoke room, there will be a children's saloon, room for maids and valets, gymnasium and children's playroom, greenhouse, verandah, swimming bath, and electric baths. The second-class accommodation will also be very superior, and will include a gymnasium.

Needless to say, the appliances for working ship and cargo will be of the latest type, the steering gear being of Harland & Wolff's well known design, and the steam winches, windlass and capstans being the most powerful, efficient and up-to-date. There will be a large refrigerating machinery plant.

There is a large and very complete electrical installation consisting of four main steam driven engines and dynamos, having a combined output of 1200 kilowatts and one 75-kilowatt auxiliary Diesel oil-driven set. The latter is situated well above the water line, so that in case of emergency it can supply lighting throughout the ship, wireless telegraphy, boat winches, and also operate the electrically controlled watertight doors when the four main sets are for any reason put out of action. In addition to the lighting, which will consist of about 4500 twenty-five candlepower lamps, the cabins are electrically heated, and there is a complete system of warm air, ventilation and suction fans, the control for all of which is grouped together at a central point, enabling the air to be kept fresh and the temperature normal at all seasons. Among other electrical apparatus there are passenger elevators for convenience in getting from one deck to another, as also electrically operated hoists in connection with the stores. The boat winches are also electrically operated, and there are in addition a number of service machines in the galleys, bakeries, etc.

The propelling machinery of the "Belgenland" consists of two sets of reciprocating engines driving the wing propellers, and one low pressure turbine driving the centre propeller. The reciprocating engines are of the inverted direct acting four crank triple expansion type, balanced on the Yarrow Schlick & Tweedy system, having four inverted direct acting cylinders, 35½", 56", 64" and 64" diameter by 5′ 0" stroke, and designed for a working pressure of 215 pounds per square inch. The turbine is of the "Parsons" reaction type and designed to operate in the ahead direction only, by exhaust steam from the reciprocating engines.

The cylinders are independent castings of high grade cast iron with liners fitted to all of them, the bottom of the cylinders being double, and strongly ribbed and arranged with loose boxes for carrying the metallic packing which is fitted for the piston rods and valve spindles.

The cylinders and casing covers are of cast iron, box section, arranged to take escape valves, lubricators, etc. The columns supporting the cylinders are of cast iron, rectangular in section and firmly bolted to sole plates and all cylinders, the tops being securely connected together with tie bars. Loose guide plates are fitted to both front and back, (the former being for the ahead motion) and both arranged for water circulation through them in order to carry away the heat which will be produced. The sole plate is of strong cast iron, box section, having nine half round recesses for shaft bushes arranged to take the crank shaft, which is built in four pieces with the angles arranged to suit the balancing of the engines.

The thrust of each propeller is transmitted by means of collars forged on to the thrust shaft to the thrust block, and is taken up on cast iron shoes lined with white metal on both sides, the weight of the thrust shaft being carried by two bearings one at each end of the thrust block.

All the shafting throughout the ship is of Siemens Martin ingot steel, made by Messrs. John Brown & Co., Ltd., Sheffield, the plummer blocks for carrying same being lined with white metal of Harland & Wolff's best quality, while the propeller shafts are fitted throughout the stern tube with a gunmetal liner in one piece.

The stern tubes are of cast iron fixed into stern frame and stern post by wrought iron nuts outside, and bolted with flange to bulkhead on the inside. Gunmetal bushes lined with lignum vitae are fitted to the stern tubes, the inner end of forward bush being arranged with stuffing box and gland. The wing propellers are fitted with three loose Manganese bronze blades, each on a cast steel boss, the blades being secured to the boss with steel studs and forged bronze cap nuts, while the turbine propeller is of solid Turbadium alloy, and on the aft end of each boss cast iron cones are fitted over the propeller shaft nuts.

The high pressure pistons are of cast iron, the intermediate pressure and low pressure of cast steel of conical shape, the weights of which have all been arranged to suit the balancing of the engine. The piston packing is of the Ramsbottom type for H. P. and I. P., and Lockwood & Carlisle for L. P., the junk rings being made specially deep for guidance as no tail rods are fitted, all the cylinders are fitted with piston valves of hard sound cast iron. The H. P. and I. P. cylinders arranged for steam to enter between the valves, the top piston in each case being larger in diameter than the bottom one to balance the weight of the valve and gear, while, in order to carry the weight of the L. P. valve (which takes steam on the outside) and gear, balance cylinders are fitted.

The reversing is effected by two of Brown's steam and hydraulic type engines, each with hand pump for pumping into the hydraulic cylinder when reversing by hand is required. The engines are arranged at the side of the H. P. front columns with the hand pump in a convenient position. Attached to the sole plate of each engine a self-contained turning engine is fitted, which turns the engine and shafting through worm-wheel gearing, which latter can also be worked by hand.

The governors are of Aspinall's type driven by lever from H. P. main engine crosshead and operate a small steam and hydraulic engine for working the throttle valve, means being provided for disconnecting the couplings and operating the engine by hand lever. An emergency governor is also fitted in connection with the main reversing engine, the reversing links being thrown into mid position when this emergency governor comes into action.

The L. P. turbine, which is direct coupled to its line of shafting, has been designed as a compromise between the propeller and turbine efficiencies and the weight, which is, of course, the usual procedure in marine practice. The turbine cylinder, bearing blocks and bushes are of cast iron, the latter being lined with white metal and arranged for forced lubrication. The rotor drum is of steel, hollow forged, the wheels of cast steel and the spindles of forged steel.

The turbine is arranged with a dummy of such diameter that the steam thrust approximately balances the thrust of the propeller, but a thrust block is also provided at the forward end of the forward bearing

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block, having phosphor bronze rings fitted into steel carrying blocks. The blading is of brass of Parson standard section.

Between the reciprocating engines and the L. P. turbine change valves are fitted, so arranged that when maneuvering, the exhaust steam from the reciprocating engines passes direct to the condensers without going through the turbine. The valves are of the balanced piston type fitted with Ramsbottom rings and worked by direct acting steam and hydraulic engines operated from the starting platform.

Electric power has been utilized for the lifting of the heavier parts of the machinery and also for the turning of the turbine rotor and its line of shafting.

A governor of the Proell type is fitted to the turbine and is arranged to operate the change valve engines, so that steam is shut off the turbine should the speed of the roter become excessive. The condensers are pear shaped, built of mild steel plates with cast iron water boxes, and are arranged with the steam branches the full length of the tubes, and are also arranged that the inlet circulating water enters the bottom and leaves at the top, the water being circulated by centrifugal pumps of the builders' own make, and of ample capacity for obtaining 28" vacuum on service. The condensate and air which enters the condensers are extracted by two independent pumps of Weir's dual type. These pumps deliver the water to two large feed tanks placed alongside, one on each side of the ship, each of which is capable of holding a ten minutes' supply of feed water when the engines are running at full power. The feed water gravitates from the tanks to the control tanks on the hotwell pumps, passing through filters on its way, the two twin feed water filters being of Carruthers' make, and are arranged in pairs so that one can be cleaned while the other is in use.

Two pairs of Weir's main feed pumps are fitted, of ample capacity, each being capable of dealing with the whole of the feed water at low speed, and discharging same through a feed heater of Weir's make to the boilers.

In addition to the above auxiliaries there are two sanitary, two bilge, and three ballast pumps, all by Harland & Wolff and all of the duplex type.

For dealing with the heating and cooking returns, a separate heater is fitted, circulated by the hotwell pump of Weir's make, while the condensation is drawn away by means of one of Weir's "Mono" type air pumps.

For port use an auxiliary condenser of Harland & Wolff's pear-shaped make is fitted, circulated by a steam driven centrifugal pump of Harland & Wolff's make. The air pump in connection with this auxiliary condenser is of Weir's "Mono" type.

For feeding the boilers in port one single cylinder pump of Weir's make is fitted in the engine room, and one pump of Harland & Wolff's make in the compartment at the forward end of the boilers; while in addition a general service donkey pump of Harland & Wolff's duplex type is also arranged in the engine room.

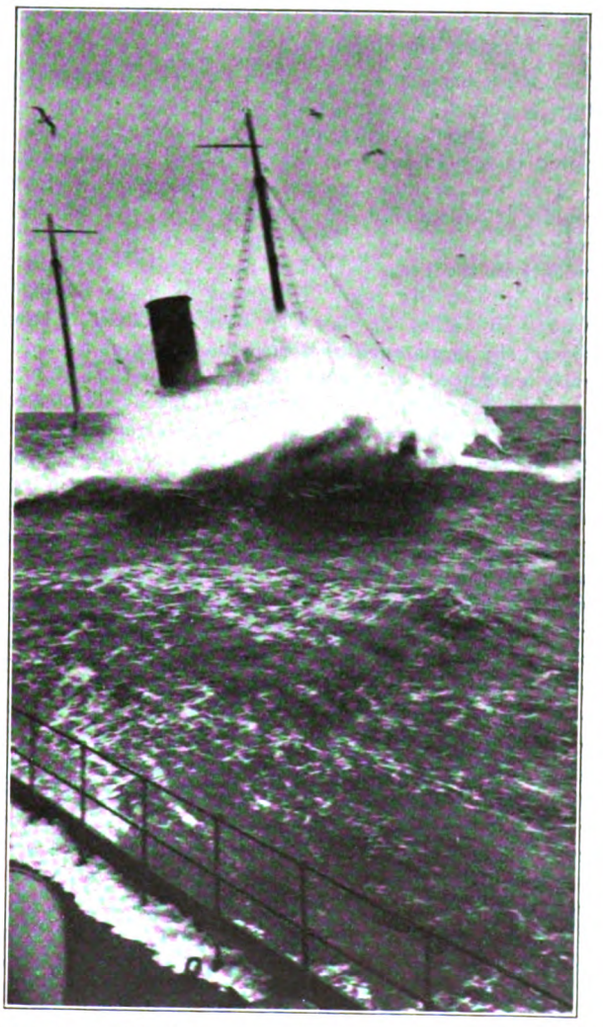
In the engine room two fresh water distillers of Hocking's make for ship's use, and two evaporators of Weir's make are fitted, while for pumping the fresh water to the deck two of Weir's single cylinder pumps of ample capacity are fitted.

For the forced lubrication to the turbine bearings two single cylinder double-acting pumps of Weir's make are fitted, each pump being capable of dealing with the full quantity of oil required, while the other is a standby. These pumps draw from the drain tanks below the floor level and discharge through cooler to the supply tank in the engine casing. For the forced lubrication of the centre and wing shaft tunnel bearings, also wing thrust blocks and bearings, one single cylinder pump of Weir's make is fitted to draw from drain tank and discharge to plummer block supply tank. There are also arranged in the special electric engine room four electric engines of Allen's make, and a refrigerator with three pumps by J. & E. Hall, Ltd.

The machinery spaces are well ventilated, eight 40" Sirocco fans being fitted for ventilating boiler rooms with cross connections and suitable trunks led down to within 7 feet of the stokehold floor, while the engine room, in addition to natural ventilation, is fitted with two 45" Sirocco fans, these fans being electrically driven.

There are ten double-ended boilers 15′ 9" diameter by 20′ 0" long, each with six Morrison furnaces, the opposite furnaces led into a common combustion chamber. The boilers have been constructed in accordance with the rules of the Board of Trade for a working pressure of 215 pounds per square inch, and are arranged to work with natural draught. Four patent hydraulic ash expellers are fitted in the boiler rooms.

The steamboat "Daring," operated by the McDowell Transportation Company on the Seattle-Vashon route, is at the shipyards of King & Winge in West Seattle undergoing a general overhauling.



Portland's municipal tug encountering heavy weather off the Columbia River bar.

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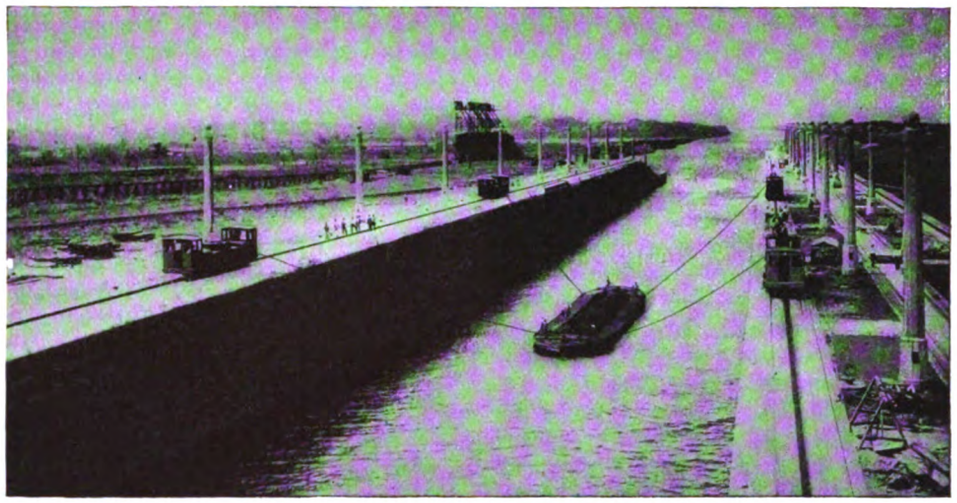


Fig. 5. Towing locomotives on first trial run, returning barge through Gatun locks to Atlantic level.

Electric Towing System for the Panama Canal Locks

The President of the United States, in June, 1905, appointed a Board of Consulting Engineers, men of international reputation, "for the purpose of considering the various plans proposed to and by the Isthmian Canal Commission for the construction of a canal across the Isthmus of Panama."

The majority report of this Board of Consulting Engineers contains the following:

"The three accidents at St. Mary's Falls Canal occurred within a period of nine years, where there is only one lockage of about twenty feet. If six locks should be adopted in a plan for the Panama Canal, each having a lift of 30 feet or more, as has been proposed in several projects, it would not be unreasonable, with an equal number of vessels, to look for six times the number of accidents in the same period of time, which would be at the rate of two per year. If groups of locks should be arranged in flights, as has also been proposed in some projects, the imminence of disastrous accidents would be greatly enhanced, as would be the amount of damage to the structures and to the vessels involved. Indeed, it is highly probable that the grave disaster of a great ocean steamship breaking through the gates of the upper lock and plunging down through those below might be realized."

It is true that the majority of the Board favored the adoption of the sea level canal; but the foregoing quotation showed the necessity, in their opinion, of safeguarding the passage of vessels through the locks.

Investigations of collisions between ships and lock gates invariably show that "there was a misunderstanding in signals between the captain and engineer." Bearing in mind that the engineer of a ship is so situated that he does not know the exact position of the ship, with respect to the lock, he cannot check his actions by the probable result. A system, therefore, which permits checking the movement of the ship with the signal given by the pilot or captain of the ship, will eliminate improper manipulations to a very great extent.

Various systems are in vogue at dry docks, which are based on the principle that the operator sees the result of his action. The employment of winches, or capstans, has been looked upon with a great deal of favor. These are usually placed at intervals along the dock walls, and the lines from the ship are carried forward to the successive capstans as the ship advances. Such a system involves the risk of the ship not being properly safeguarded when the lines are transferred to successive capstans. An improvement has been made by the installation of a capstan at the head of the dock, centrally located, and used for imparting a straight motion to the ship. Numerous lines from the ship to the dock wall are carried by men; and the capstans are employed to counteract any wind pressure, currents, etc., and assist generally in maneuvering the ship. While an improvement over former methods, it did not, however, possess the flexibility and reliability required for the operation of the locks of the Panama Canal. Neither would it have eliminated the breaking of the lines at critical moments, which is regarded as one of the essential requirements in successfully handling ships in canal locks.

After a very thorough study of the entire problem of maneuvering ships through the locks of the canal, it became evident that they should not proceed through the locks under their own power, and that a substitute for the ship's power should embrace the following requirements:

(a) Ability to place the ship in proper relation to the lock.

(b) Capability of keeping the ship to its course.

(c) Accelerating and retarding the ship without rupturing the lines.

(d) The lines when once attached should be used without change for lockage in flight.

(e) A small number of skilled operators rather than a large number of unskilled men to co-ordinate.

The towing system described in the following pages was designed and patented by Mr. Edward Schildhauer, Electrical and Mechanical Engineer of the Isthmian Canal Commission, and the forty towing locomotives and all the electrical apparatus for operating the locks, were built by the General Electric Company.

In passing through the canal from the Atlantic to the Pacific, a vessel will enter the approach channel in Limon Bay, which extends to Gatun, a distance of about seven miles. At Gatun it will enter a series of three locks in flight and be raised 85 feet to the level of Gatun Lake. It may then steam at full speed through the

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channel in this lake, for a distance of 24 miles, to Bas Obispo, where it will enter the Culebra Cut. It will pass through this cut, which has a length of nine miles, and reach Pedro Miguel, where it will enter a lock and be lowered 30 feet. Then it will pass through Miraflores Lake for a distance of one and one-half miles until it reaches Miraflores, where it will be lowered 55 feet through two locks, to the sea level, after which it passes out into the Pacific through an eight and one-half mile channel.

The main features of all the lock sites are identical; and the following brief description of the Gatun locks, with special reference to the arrangement of the towing tracks, ship channels, inclines and approaches, is given to enable the reader to obtain a clearer conception of the towing scheme in general, as well as the more detailed description of the locomotive which is to follow.

The general layout of the Gatun locks is clearly shown in Fig. 1; and it is noted that there are two ship channels, one for traffic in each direction. The channels are separated by a center wall, the total length of which is 6330 feet. There are two systems of tracks, one for towing and the other for the return of the locomotive when returning idle. This, however, refers only to the outer walls. For the center wall, there is only one return track in common for both the towing tracks. The towing tracks are naturally placed next to the channel side, and the system of towing utilizes normally not less than four locomotives running along the lock walls. Two of them are opposite each other in advance of the vessel, and two run opposite each other following the vessel, as seen in Fig. 2. The number of locomotives is, however, increased when the tonnage of the ship demands it.

Cables extend from the forward locomotives and connect with the port and starboard sides respectively of the vessel near the bow, and other cables connect the rear locomotives with the port and starboard quarters of the vessel. The lengths of the various cables are adjusted by a special winding drum on the locomotive to place the vessel substantially in mid-channel. When the leading locomotives are started, they will tow the vessel; while the trailing locomotives will follow and keep all the cables taut. By changing the lengths of the rear cables, the vessel can be guided; and to stop the vessel, all the locomotives are slowed down and stopped, thus bringing the rear locomotives in action to retard the ship. Therefore, the vessel is always under complete control quite independent of its own power, and

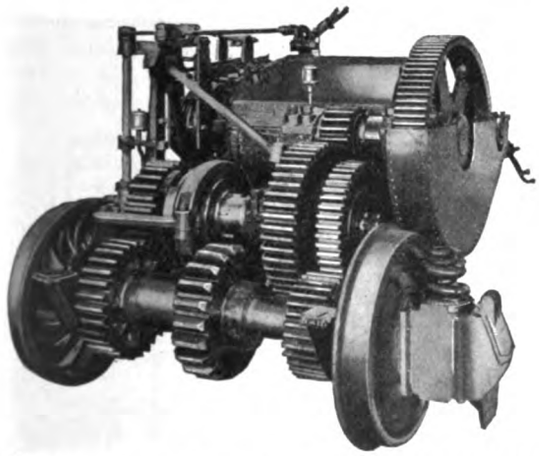


Fig. 16. Front view of traction motor unit with journal box in place.

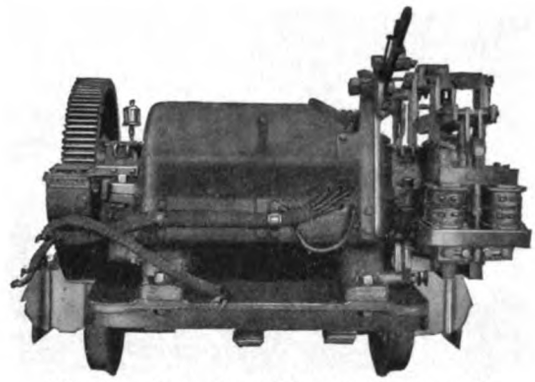


Fig. 20. Rear view of traction motor unit.

the danger of injury to the lock walls and gates is very greatly lessened.

The illustration in Fig. 3 shows how effectively the four locomotives keep the vessel under control and in the center of the channel, while Figs. 4 to 8 give a general idea of the method of handling vessels of various sizes. They also show general views of the lock walls, towing tracks and the inclines, the steepness of the latter being especially noticeable. Of particular interest is Fig. 6, which represents a trial tow approaching the second level. The water in the middle lock or at this second level is at sea-level, a condition not obtained in regular operation, and this trial was made to demonstrate that the tow lines would clear the lock walls.

The towing tracks have a specially designed rack rail extending the entire length of the track and located centrally with respect to the running rails. It is through this rack rail that the locomotive exerts the traction necessary for propelling large ships and climbing the steep inclines.

A rack rail is also provided on short portions of the return track so as to lower the locomotives safely from one level to the next. The steepest slope is 26 degrees or 44 per cent, hence the need will be seen for rack rail even on the return track, it being noted that any

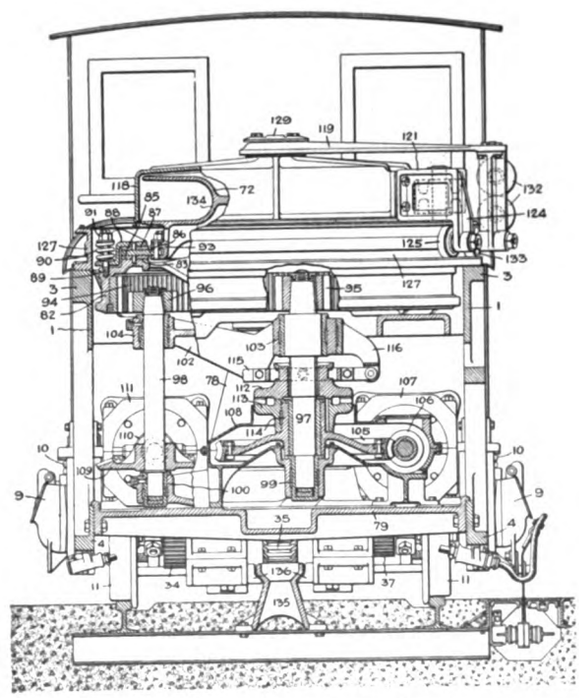


Fig. 13. Cross section near winding drum.

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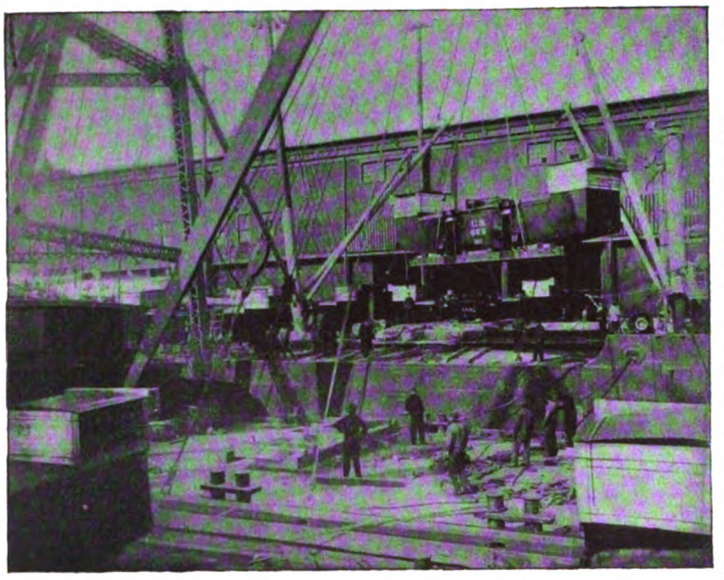


Fig. 42. Locomotives being loaded by Merritt-Chapman Derrick aboard SS. "Ancon" en route to Christabal.

traction locomotive with the usual wheel drive, even with the brakes set, would begin to slide on a 16 per cent grade and, therefore, could not be controlled. With a rack rail, however, traction is limited only by the capacity of the driving motors and not by the adhesion of the wheel treads on the rails.

A small portion of rack rail is shown in Fig. 9, "A" being the rack rail proper and "B" the approach to it. "B" is hinged at "C" so that it can be depressed on the approach of the rack pinion of the locomotive. The teeth of the approach section are under size and shaped off at the extreme end so that the teeth of the pinion will mesh properly and prevent excessive strain on the pinion and the axle. The spring "D" restores the approach to the proper position after the locomotive has passed over. The rack rail is of the shrouded type, and each tooth space has a drain hole cast in the bottom so as to carry off water and other accumulations to suitable drain pipes or ducts set in the concrete of the walls. A further feature of the rack rail is the projecting edges, which permit thrust wheels attached to the locomotive to run along the under side and prevent overturning of the locomotive, in case some unforseen operating condition should produce an excessive pull on the tow line. These thrust wheels serve to counteract the lateral component of the towline pull and the flanges act for emergency only, as the weight of the locomotive is, however, sufficient to prevent overturning with a normal pull of 25,000 pounds on the tow line. This is illustrated in cross section Fig. 13.

Three-phase, 25-cycle, 220-volt alternating current is used for operating the locomotives, and the current is supplied to the locomotives through an underground contact system. The collecting device is illustrated in Fig. 10; while Fig. 13 shows its position with respect to the track, it being adjacent to the running rail on the side remote from the lock. Two T-rails (shown in black section) form two legs of the three-phase circuit and the third leg is formed by the main track rails. A specially designed contact plow slides between the two "T" conductors and transmits the power from the rails to the locomotive. This contact plow also passes through the slot opening in the conduit cover and is flexibly connected to the locomotive in such a manner as to follow all irregularities in the tracks and cross-overs, and therefore insures a continuous supply of power.

Locomotive Design.

The working parts of the locomotive are supported by two longitudinal upright side frames, No. 1, Fig. 11, of cast steel, connected by transverse beams, No. 2, Fig. 12. These frames are in effect deep rigid trusses, having upper and lower members connected by posts, No. 5, and diagonal braces, No. 6, Fig. 11. The middle portion of each frame has its upper and lower members parallel and horizontal, but the end portions have their lower members inclined upwardly towards the ends of the frame. The pedestals, No. 7, for the wheel axles, No. 8, are located at the junction of these end portions with the middle portion, and are of the usual locomotive type, having vertical parallel jaws between which the journal, No. 9, slides. Springs, No. 10, are interposed between the tops of the journal boxes and the tops of the pedestals, and the locomotive is thus mounted upon four wheels, No. 11, carried on the two axles, No. 8, the wheelbase being 12 feet, and the overall length of the locomotive over 32 feet.

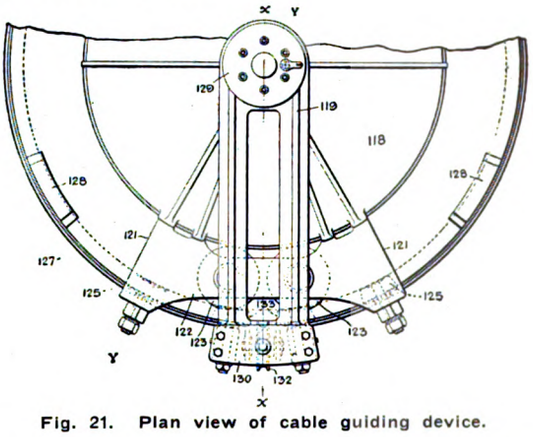


Fig. 21. Plan view of cable guiding device.

Each axle is driven by its own motor, independent of the other; and, as the construction is identical at both ends of the machine, a description of one will suffice for both. A cast steel suspension bracket, No. 12, Fig. 14, is hinged at one end on the axle. Its bearings, No. 13, which fit the journals on the axle, are secured in place by caps, No. 14, which are provided with oil cellars, No. 15. The bracket is provided with bearings for a transverse jack shaft, No. 16, parallel to the axle; and it has pulley blocks, No. 17, for a countershaft, No. 18, also parallel to the axle. It has a substantial horizontal platform, No. 19, to support the driving motor, No. 20;

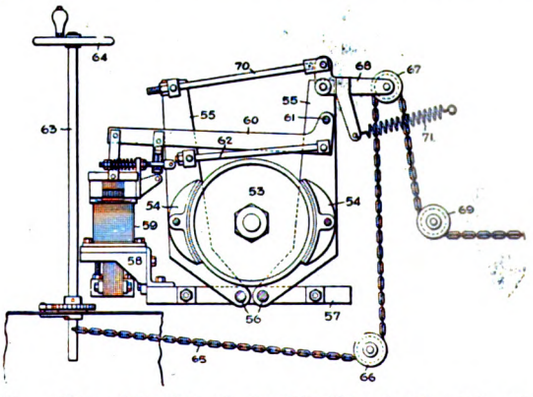


Fig. 19. Side elevation of combination hand and solenoid brake and rigging.

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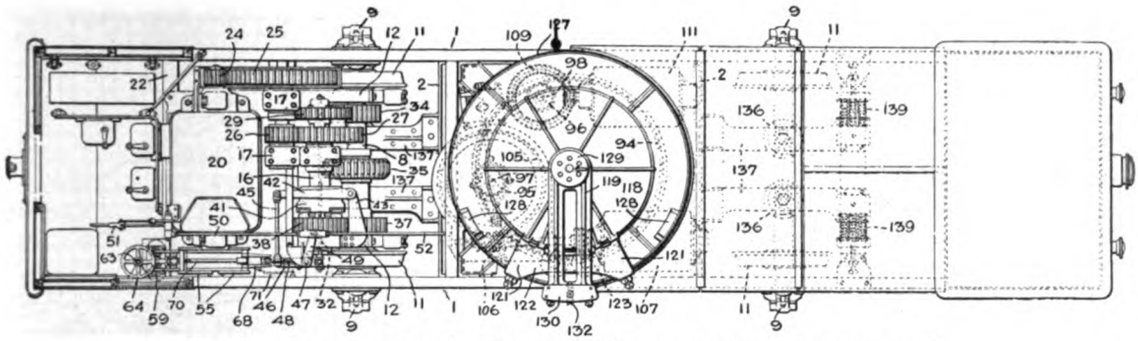


Fig. 12. Plan view of towing locomotive with covers removed from one end.

and its outer end is supported at each corner by two springs, No. 21, placed above and below a stationary angle iron, No. 22, and connected to the bracket by a bolt, No. 23, so as to afford a yielding support in both upward and downward movements of the bracket.

The motor, No. 20, is of the three-phase, slip-ring type, enclosed and identical to the rugged steel mill design; and it is geared by a pinion, No. 24, and spur-gear, No. 25, to the countershaft, No. 18, which carries a pinion, No. 26, meshing with a spur-gear, No. 27, Fig. 15, keyed to the jack shaft, No. 16. On the outer side of the spur gear, No. 27, are formed clutch teeth which cooperate with similar teeth, No. 28, on the adjacent side of a gear, No. 29, which is sleeved upon the jack shaft of the track, and this only when running without load and between inclines.

When the locomotive, however, reaches one of the inclines between the locks, the grade of which may be as much as 44 per cent, or when it is towing a ship, the cog rail system is utilized to enable the locomotive to climb the grade and exert traction necessary for pulling large ships. The cog or rack rail is laid between the track rails; and the locomotive is provided with a cog wheel or rack pinion, No. 35, Fig. 17, secured to or integral with a sleeve, No. 36, which rotates freely on the axle.

A gear wheel, No. 37, secured to or integral with this sleeve, meshes with a gear, No. 38, Fig. 15, turning

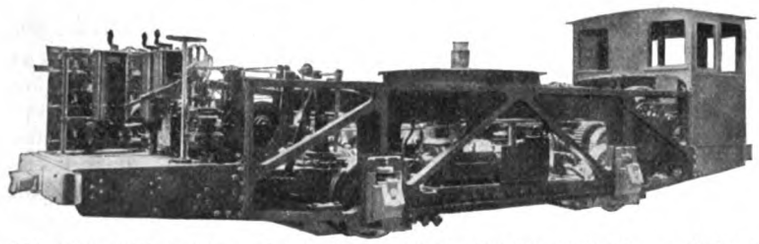


Fig. 39. Side view with covers and one cab removed, showing controllers and front of panel.

and can be slid lengthwise thereon to engage and disengage the clutch teeth. The means for sliding this gear consists of a disc, No. 30, secured to the gear and having a central hub, No. 31, fitting over the end of the jack shaft, Fig. 15. A rod, No. 32, Fig. 15, runs through a central hole in the shaft and through the center of the hub, No. 31, to which it is connected by the nuts, No. 33, in such a manner as to permit the disc to rotate with the wheel and, at the same time, cause it to slide the wheel axially when the rod is reciprocated. A pinion, No. 34, Fig. 17, is keyed to the axle, No. 8, and is wide enough to mesh always with the gear, No. 29, so that when the clutch teeth, No. 28, are engaged, the motor will propel the locomotive by the adhesion between the wheels, No. 11, and the rails loosely on the jack shaft. Clutch teeth, No. 39, on this gear can be engaged by the teeth, No. 40, on a clutch, No. 41, which is splined to a jack shaft. A two-armed lever, No. 42, fulcrumed on a bracket, No. 43, straddles the shaft, No. 16, and is pivoted to a collar, No. 44, riding in a groove in the clutch, No. 41. The lever is connected by a link, No. 45, with one end of a lever, No. 46, Fig. 15, turning loosely on a vertical rock shaft, No. 47. An elastic arm is keyed to the shaft and engages lugs on the lever, No. 46. The arm, No. 48, is composed of a laminated flat steel spring, Fig. 18, and a second arm, No. 49, is keyed on the shaft and connected by a rod, No. 50, with a handle in the cab of the locomotive. The handle can be locked by a suitable latch and notched quadrant, and the other end of the

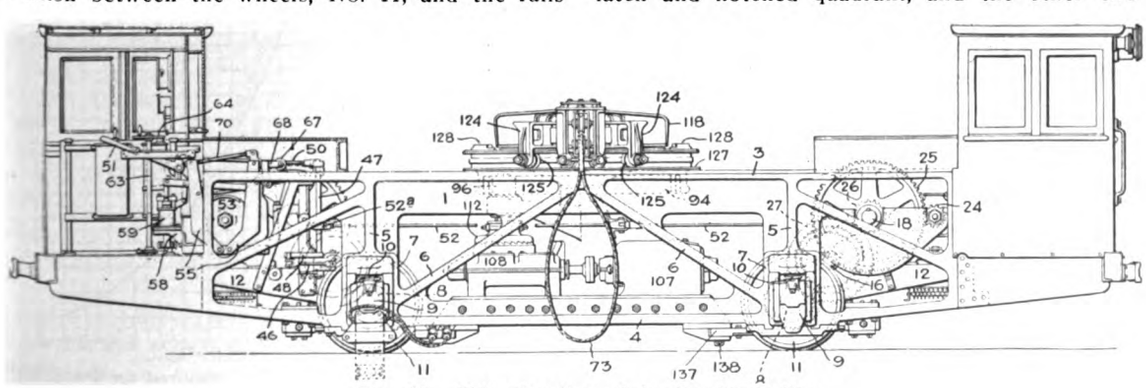


Fig. 11. Side elevation of towing locomotive.

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lever, No. 46, is pivoted to the rod, No. 32, so as to throw out the clutch, No. 28, when the clutch, No. 40, is thrown in, and vice versa.

The elastic arm, No. 48, serves to throw the clutches automatically, it being understood that the four jaw clutches in most cases do not mesh when thrown, but the operating handle is thrown full stroke and locked. This puts the springs under heavy tension. The locomotive is then started slowly; and when the clutches are in alignment, the springs throw them without any attention by the operator. The two rocker shafts at opposite ends of the locomotives are connected by the rods, No. 52, pivoted to the rocking arms, No. 52a, on the shafts and to an intermediate lever, No. 52b, fulcrumed on the pedestal supporting the winding drum. Figs. 16 and 18 will be of assistance in making clear the foregoing description of the clutches and gear.

The two traction motors, No. 20, are controlled by suitable controllers installed in the cabs at the ends of the locomotives; and the circuits are such that both motors can be controlled from either cab, and can be operated singly or in multiple as desired. Current is taken from the supply conductors by a special current collecting device, as shown in Figs. 11 and 13 previously described.

It will be observed that each motor, with all its gearing and clutches, is mounted independently of the frame of the locomotive, to which it is connected only by the springs, No. 21, which give an elastic support for the outer end of the bracket, No. 12, on which the mechanism is carried as shown in Fig. 14.

In connection with each motor a powerful brake is installed; and, as during operation, the motors are at all times geared either to the axles or to the cog wheels, the truck wheels, No. 11, are not provided with any brake rigging. The motor brake is shown in Figs. 11 and 12, but it is more clearly illustrated in Figs. 19 and 20. On the motor shaft is keyed a brake disc or drum, No. 53, Fig. 19, and to opposite sides thereof are applied the brake shoes, No. 54, carried by the brake levers, No. 55, which are pivoted at No. 56 on a stationary bar, No. 57, projecting from a frame, No. 58, which supports a solenoid, No. 59. The movable core of this solenoid is pivoted to the long arm of a lever, No. 60,

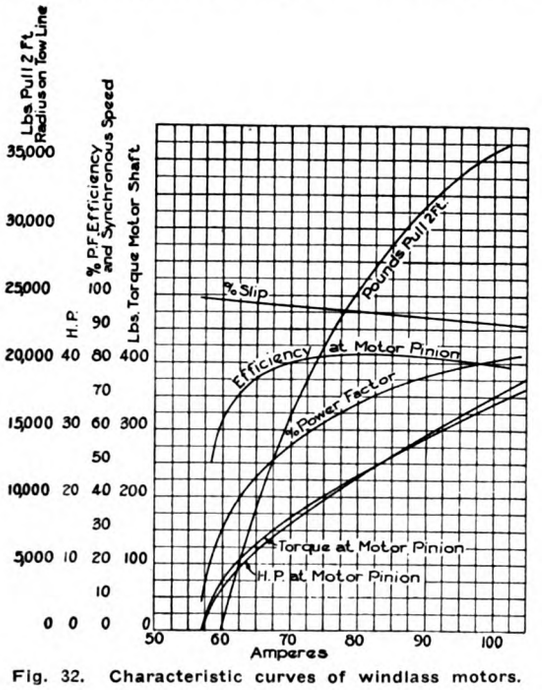


Fig. 32. Characteristic curves of windlass motors.

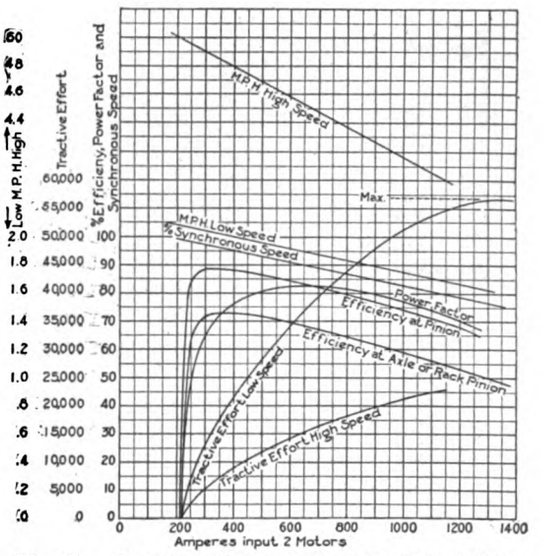


Fig. 33. Characteristic curves of traction motors.

which is fulcrumed at No. 61 on one of the brake levers. A rod, No. 62, connects the angle of this lever with the other brake lever, thus constituting a sort of toggle between the two levers. When the core of the solenoid drops, it actuates the lever and the rod in such a manner as to draw the two brake levers towards each other and thereby apply the brake shoes to the drum. The winding of the solenoid is in circuit with the controller of the motors, so that when the current is turned on to energize the motor windings, the solenoid will lift its core and thereby release the brakes. The first point of the controller raises the brakes without applying power to the motors, thereby providing a coasting point. But should the motor current be shut off, either intentionally or accidentally, the core will instantly drop by gravity and its weight will exert a

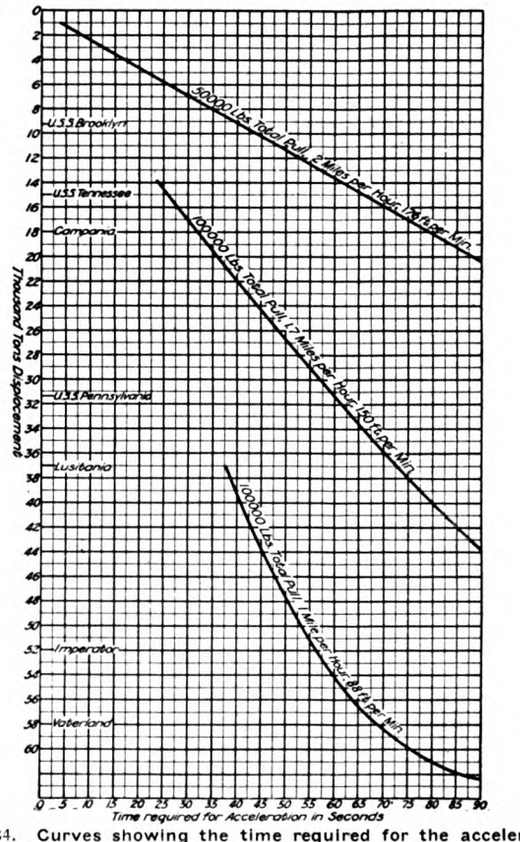


Fig. 34. Curves showing the time required for the acceleration of ships.

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powerful leverage upon the brake levers to stop the motor and the locomotive. This action occurs simultaneously on both motors, and brake action is powerful enough to stop the locomotive within two revolutions of the wheels.

In addition to this automatic brake, means are provided for applying the brakes manually in order to supplement the action of the automatic feature, if necessary, when descending a grade or where approaching a rack rail. An upright shaft, No. 63, Fig. 19, provided with a hand wheel, No. 64, has attached to it one end of a chain, No. 65, which runs under a stationary pulley, No. 66, up over a pulley, No. 67, on one end of an elbow lever, No. 68, pivoted to one of the brake levers, and thence under a stationary pulley, No. 69, to the opposite end of the locomotive. The elbow lever, No. 68, has its other arm connected by a rod, No. 70, to the other brake lever, the rod being adjustable in length as shown. The lever, No. 68, and rod, No. 70, constitute a toggle connecting the brake levers. A spring, No. 71, tends to lift the arm carrying the pulley, No. 67, and thus holds off the brake shoes. When the brake staff is turned, it winds up the chain and draws down the pulley, No. 67, thereby applying the brake shoes to the drum. In this way, the operator can add hand power to the effect of the electric brake and thus produce a greater braking action without interfering with the automatic operation of the solenoid.

As appears from Fig. 12, the brake levers, No. 55, are double, only the rear member of each being shown in Fig. 19. This avoids any bending strains on the pivots. The levers, No. 60 and No. 68, and the rods, No. 62 and No. 70, constituting the two toggle systems, are located between the two members of each lever, as are also the brake shoes, No. 54. The chain, No. 65, extends from the pulley, No. 69, to the similar point in the brake rigging of the motor at the other end of the locomotive, so that the operation of either of the brake staffs will apply both brakes simultaneously. It will be noted that while the hand and solenoid brake mechanism operate entirely independently of each other, both apply braking through the same levers and wheel.



Fig. 7. Operation of Gatun Locks. S. S. "Ancon" entering upper lock from middle west chamber under tow of electric locomotives. Looking south from balcony of control house.

Passing now to the features which render the locomotive peculiarly adapted for towing purposes, it is observed that the drum, No. 72, Fig. 22, on which the cable, No. 73, Fig. 11, is wound, is located midway between the ends of the locomotive and above the upper member, No. 3, in Fig. 11, of the side frames, so that the cable can be led off on either side of the machine and through a wide range of angles to the line of travel. The hub, No. 74, Fig. 22, of the drum is pivoted to the hub, No. 75, of a spider, No. 76, which in turn rotates upon the upper portion of a massive, tubular, vertical, cylindrical column, No. 77, rising from a pedestal, No. 78, Fig. 25, secured to the baseplate or floor, No. 79, Fig. 13, which is supported on the lower members, No. 4, of the side frames. The upper portion of the pedestal is held in a brace, No. 80, Fig. 24, which is shown as a heavy X-shaped casting, fastened to the upper members, No. 3, of the side frames and to two of the cross beams, No. 2. This brace fits the pedestal just below the shoulder, No. 81, Fig. 22, on which the hub, No. 75, is stepped.

The spider, No. 76, Fig. 22, supports a circular rim, No. 82, which has a horizontal upper surface, No. 83, and a flange, No. 84. On the surface, No. 83, is secured a flat, smooth bronze ring, No. 85, and a second brass ring, No. 87, similar to the first, lies on top of a steel ring and is secured to a flanged follower, No. 88. Sixteen studs, No. 89, project up from the rim, No. 82, through holes in a horizontal flange of the follower and are encircled by strong springs, No. 90, which abut between the flange and nuts, No. 91, on the studs and press all three rings tightly together. The steel ring, No. 86, is secured to lugs, No. 92, on a flange, No. 93, projecting downward from the winding drum, No. 72, so that the rings constitute a friction clutch between the spider and the drum.

Inside the flange, No. 84, on the spider is secured a large internal gear, No. 94, with which mesh two driving pinions, No. 95 and No. 96, Fig. 13, secured respectively to two upright shafts, No. 97 and No. 98. Step bearings, No. 99 and No. 100, are provided for these shafts in the base of the pedestal, No. 78, Fig. 13, while the arms, No. 101, Fig. 12, and No. 102, Fig. 12, projecting from the upper portion of the pedestal just below the brace, No. 80, Fig. 13, constitute guide bearings, No. 103 and No. 104, for the upper portions of the vertical shafts. A worm gear, No. 105, Fig. 13, is clutched to the shaft, No. 97, and is driven by a worm, No. 106, on the shaft of an electric motor, No. 107, bolted to the base, No. 79, of the locomotive. This gearing is protected by a casing, No. 108. A bevel gear, No. 109, is keyed to the upright shaft, No. 98, and meshes with a bevel pinion, No. 110, on the shaft of an electric motor, No. 111, fastened to the base.

The motor, No. 111, with bevel gear pinion is used for driving the drum at a high speed when coiling the cable that has been cast off, and it remains permanently in gear. The other motor, No. 107, with worm gear drive is used for taking in the cable when it is under load, and the drum operates as a windlass or capstan.

Due to the greater gear reduction, it operates the drum at a much slower speed, and consequently, with motors of approximately equal size, a greater force may be exerted on the tow line than would be possible with the lower speed reduction which is used with the high-speed coiling motor, No. 111. The worm gear drive is disconnected from the drum when not in use. To accomplish this a clutch is provided, having one mem-

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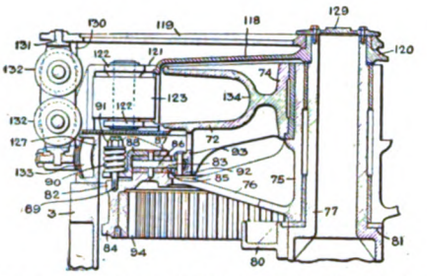


Fig. 22. Cross section of cable guiding device through line X-X of Fig. 21.

ber, No. 112, Fig. 13, splined to the shaft, and the other member, No. 113, attached to the hub, No. 114, of the worm gear, which is sleeved on the shaft.

A lever, No. 115, Fig. 26, fulcrumed to a lug, No. 116, on the arm, No. 101, is pivoted to the hub of the clutch member, No. 112, and its other end is attached to the movable core of a solenoid, No. 117, which is connected in the controller circuit of the motor, No. 111, so that whenever the circuit of the latter is closed to coil up the cable rapidly, the solenoid will lift its core and also the lever, No. 115, thus throwing out the clutch of the winding motor. The first point of the controller which operates the motor, No. 111, raises the clutch, and on the second point the motor starts.

The guide which directs the cable, as it pays out or winds up, is mounted so as to revolve on the axis of the drum. It comprises two angularly adjustable por-

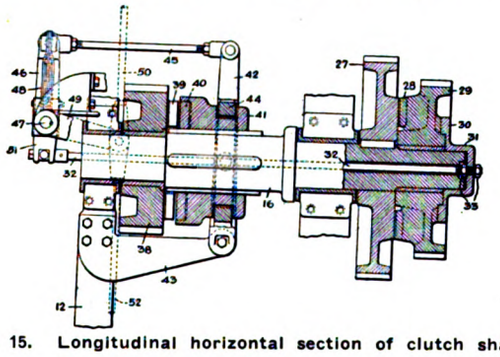


Fig. 15. Longitudinal horizontal section of clutch shaft.

tions, No. 118 and No. 119, Figs. 21 and 22, the former being a circular bell which serves as a cover for the winding drum. The hub, No. 120, Fig. 22, of the bell is journaled on the upper end of the column, No. 77, being stepped on a shoulder thereon. At one side the housing is cut away to admit the cable to the drum,

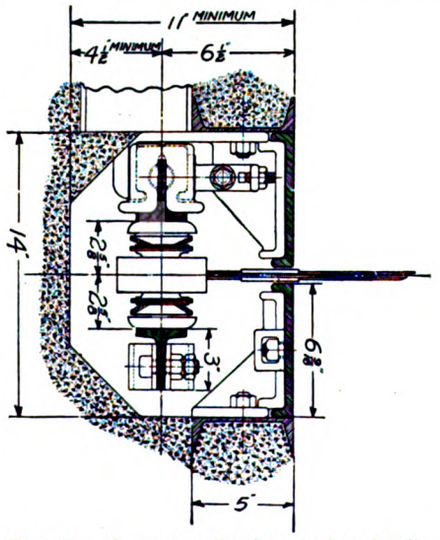


Fig. 10. Current collecting device detail.

and on each side of this opening is bolted one end of a frame, comprising box-like ends, No. 121, Fig. 23, connected by two parallel bars, No. 122, Fig. 22, one above and the other below the opening. Between the bars and on either side of the opening are two upright guide rolls, No. 123, Figs. 21 and 22, having cylindrical faces and rotating on journals bearing on the bars, No. 122. At each end of this frame, arms, No. 124, Figs. 13 and 23, extend downward and support two rollers, No. 125, Fig. 13, mounted on horizontal studs, No. 126, Fig. 23, secured in the arms. These rollers are adapted to travel between the upper and lower flanges of a circular channel iron, No. 127, Fig. 23, which is fastened on top of the side frames concentric with the column, No. 77, and forms a track supporting the outer end of the frame, No. 121 and No. 122, thus relieving the column, No. 77, of the weight thereof. Stops, No. 128, Fig. 11, are fastened to the top of the channel iron, No. 127, to limit the angular play of the guide member, No. 118. They can readily be taken off, and the housing can be turned until the rollers, No. 123, are on the opposite side of the locomotive, after which the stops can be attached on that side to limit the movement of the housing.

The other guide member, No. 119, is a radial casting having one end turning freely on the hub of the member, No. 118, Figs. 13 and 21. A cap, No. 129, Fig. 21, is provided at the top of the column, No. 77, and protects the joint and prevents the guide members from accidentally coming off. The outer end of the member, No. 119, is an upright rectangular frame, No. 130, in whose top and bottom is journaled on a vertical axis, a swivel, No. 131, carrying two grooved sheaves, No. 132, these also being led one above the other on horizontal axles. The edges of these sheaves are in close contact, so that their grooves form an opening through which the cable, No. 73, passes, approximately, in line with the middle of the guide rollers, No. 123. The frame, No. 130, is supported by rollers, No. 133, Fig. 13, running in the track, No. 127, and the guide member has an angular movement with reference to the member, No. 118, limited by the frame, No. 130, striking the ends of the frame, No. 121. When the cable is pulled either forward or backward from the

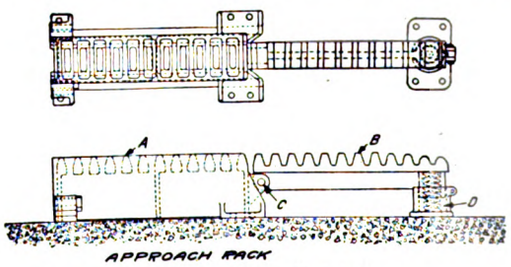


Fig. 9. Rack rail detail.

middle position, which it occupies in Fig. 11, the swivel permits the grooved rollers, No. 132, Fig. 22, to move with it, and the guide member, No. 119, swings also, so that the rollers, No. 132, continue to support the rope in a line with the middle of the rollers, No. 123, without being themselves subjected to any side strain. All lateral strains are sustained by heavy guide rollers, No. 123, the cable moving up and down between them as it winds on the drum. The latter is in the form of a deeply grooved wheel, the groove, No. 134, being U-shaped. Figs. 27, 28 and 29 clearly illustrate the construction.

Fig. 29 shows the cable guard. This is a steel casting having a thickness of only three-eight inch. The

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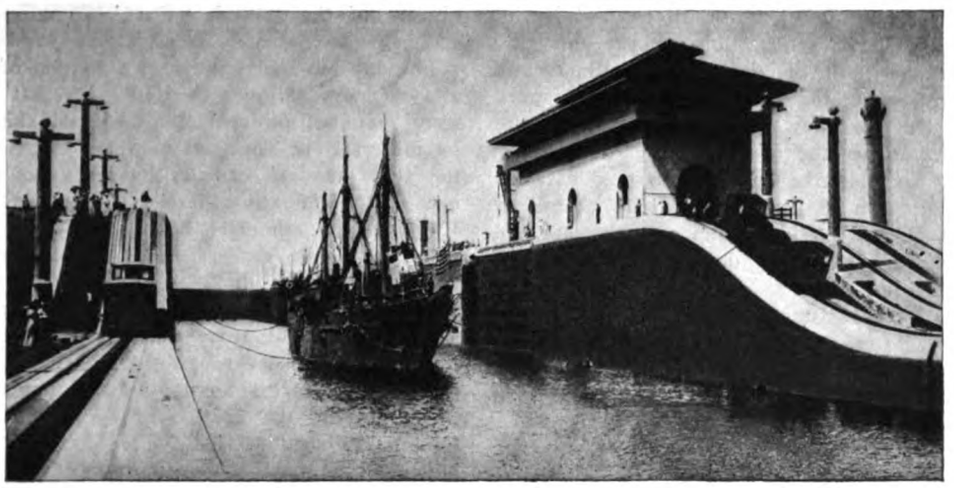


Fig. 4. Operation of Gatun Locks. U. S. Tender "Severn" leaving upper east chamber in tow of electric locomotives.

diameter is 4 feet 6 inches, and the circular flange 17 inches deep. This casting was pronounced to be beyond the possibilities of the ordinary open hearth furnace by a number of steel foundries. The castings were eventually produced in the contractor's electric furnace, where it is possible to intensify the heat so as to make the metal flow more rapidly. No failures occurred. With the exception noted, all other principal steel castings for these locomotives were produced at the plant of the Wheeling Mold & Foundry Company, Wheeling, W. Va.

In order to resist the tendency of the locomotive to tip over when an excessive load comes on the cable, a stout rack rail, No. 135, Fig. 13, is as previously mentioned, laid between the traction rails of the track, and two horizontal flanged wheels, No. 136, are arranged between each pair of wheels, No. 11, to engage the opposite sides of the rack. These wheels are carried on heavy bars, No. 137, whose inner ones are pivoted at No. 138, Fig. 11, to the base of the machine, so that the bars can move horizontally. Their outer ends are engaged by strong springs, No. 139, which afford the necessary flexibility for smooth operation.

One of the most important parts of the locomotive is the "slip-friction" device, consisting of two special alloy rings, mounted on the spider, as has been previously explained. Between these rings a steel disc is fastened to the rope drum; and the amount of tension on the tow line is adjusted by the pressure between these three discs, and is obtained by tightening the spiral springs on the clamping ring. In order, therefore, to make the slipping tension of the tow line proportional to the pressure between the friction discs, a rubbing surface having an absolutely constant co-efficient of friction is essential. In order to find such a metal, certain tests were made as indicated by the accompanying curves in Fig. 30, which is self-explanatory. The low friction metal, having a friction co-efficient of 0.1, is practically constant under all pressures and condition of the surfaces, and therefore was selected for the work. This metal also showed but very little difference in co-efficient between starting and running. The results of the special tests were furthermore amply verified by the final test of the friction discs of each machine under full rated tow line pull of 25,000 pounds by means of the dynamometer testing outfit shown in Fig. 31. All forty machines were given this slip test twenty-five times from each cab, and all passed the Government requirement not to exceed a variation of 5% above or below the normal of 25,000 pounds.

In connection with the slip test, further data on the slow winding motor was obtained as per curves in Fig. 32. The winding motor is a 20 h. p. (one hour rating), three-phase, high torque, squirrel cage type, induction motor controlled from a drum type reversible controller in either of the two cabs. From the curves it is seen that the motor has ample power to take care of any sudden pull on the tow line up to 40,000 pounds, which is well above the normal requirement of 25,000 pounds. The speed of winding is at the average rate of 12 feet per minute.

The rapid-coiling motor is permanently geared to the drum and is of the same type, size and capacity as the winding motor. It is subjected to its maximum load when accelerating the heavy drum to the high speed required for coiling or paying out the rope, this being sixteen times the slow winding speed at full load, or about 200 feet per minute.

The slow-winding and the rapid-coiling motors are operated by similar controllers and the circuits electrically interlocked so as to prohibit application of power to either motor unless the controller of the other motor is in the "off" position.

Each of the two main traction motors has a rating of 75 h. p., and is of the slip ring induction type, operated by a system of contactors with master controller in each cab. The motors, by means of the change in gearing from straight traction to rack rail towing previously described, drive the locomotive at a speed of two miles per hour when towing and five miles per hour

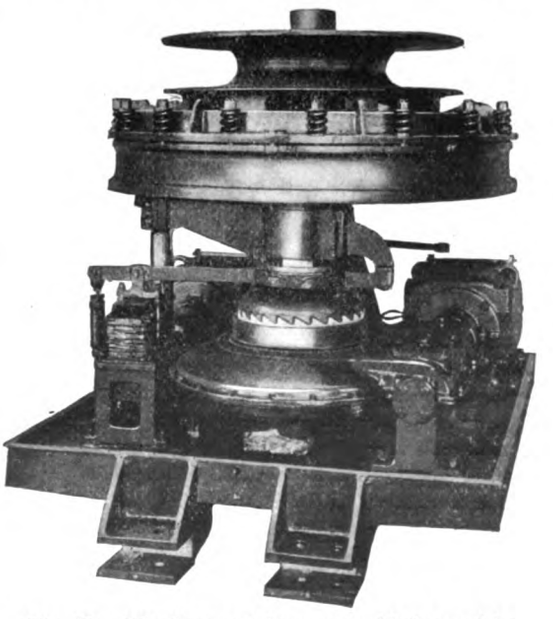


Fig. 27. Windlass and base assembled complete.

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when returning idle. These motors act as induction generators running above synchronous speed when the locomotive is passing down the steep inclines and thereby exert a retarding brake effect to keep the speed uniform. Speed tractive effort and efficiency tests were made with results as per the curves in Fig. 33.

The curves in Fig. 34 give some interesting data on the time of acceleration of ships in the lock chambers. These values have been obtained from certain tests and theoretical calculations based on data given by several well-known authorities.

For determining the resistance of ships in deep open water, the following formula is given by Captain Charles W. Dyson in his work, "The Estimation of Power for Propulsion of Ships":

$$R = f\ S\ V^{1.85} + \frac{b\ D^{\frac{2}{3}}\ V^4}{L}$$

Where

R = Resistance in pounds.
f = Surface friction coefficient, varying from 0.008 to 0.009.
S = Wetted surface in square feet.
V = Speed in knots per hour.
b = Form factor, varying from 0.35 for fine long ships to 0.50 for freighters.
D = Displacement of ship in tons.
L = Length of ship in feet on load water line.

The above formula gives, as stated, the resistance in deep open water; and it is well known that this is greatly increased when the ship is passing through narrow channels, due to the reaction of the water on the side walls and bottom. This additional resistance may be found by the following formula, giving in a report by the State Engineer of New York on the proposed Barge Canal (See Engineering Record, June 29, 1901):

$$R_1 = \frac{6.8}{r - 1.3}$$

where

$$r = \text{Ratio}\ \frac{\text{Canal Section}}{\text{Midship Boat Section}}$$

In order to obtain the total ship resistance, the value of "R" previously obtained should be multiplied by the value obtained for "R_1."

Space does not permit of a detailed description of the locomotive control apparatus, but a fairly good idea will be had by reference to the diagram of connections shown in Fig. 35.

Summary.

The towing locomotives as described and illustrated possess the following operating characteristics:

1—While towing, the speed can be regulated from zero miles to two miles per hour.

2—While running idle, the speed can be regulated from zero to five miles per hour, permitting return trips at increased speed.

3—The windlass will pay out or wind in cable at the low rope speed and at the full tow line pull of 25,000 lbs., either when the locomotive is running or at rest.

4—The windlass will pay out or coil in cable at the high rope speed with the tow line taut, either when the locomotive is running or at rest.

5—The windlass is equipped with a safety friction device, which is adjustable to any predetermined value of the tow line pull.

The first impression may be gathered that these machines are somewhat complicated; but, considering their many functions and the great flexibility for performing them, the design is in reality peculiarly simple. The locomotives have fully demonstrated in actual operation that the requirements contemplated by the Engineers of the Isthmian Canal Commission under Circular 650 have been successfully met.

The locomotives have a net weight of 86,300 pounds and a gross shipping weight of 92,500 pounds. They were mounted on specially designed skids and shipped by rail to New York, where they were loaded on board the ships as deck cargoes by means of a Merrit-Chapman 125-ton floating derrick. The illustration in Fig. 42 shows a locomotive being loaded on S. S. "Ancon," which in this case carried six locomotives to the Isthmus.

During the first three months of commercial operation of the Canal, from August 15 to November 15, the cargo transported through the Canal and towed through the locks by the locomotives amounted to 1,079,521 tons. During the fiscal year ending June 30, 1914, the Panama railroad carried 643,178 tons of through freight between the two seaboards, and in the preceding fiscal year 594,040 tons. From this it is seen that between six and seven times as much cargo is passing over the Isthmus now as passed over this route when goods were transshipped by rail.

Among the early voyagers who help to fill our school histories with encouraging stories for the young, none holds a stronger appeal to the imagination than Henrick Hudson, who, according to said histories, was the first man to stroll along Broadway. Henrick was the captain of the famous old packet "Half Moon," which for many years was profitably employed carrying summer visitors from Philadelphia to Baffin's Bay. As to his antecedents, it is sufficient to say that he came from one of the first families in Harlem and was early noted for a studious disposition, being often reproved for preoccupation when selling morning papers in the streets of Amsterdam.

His mother, who had just crushed in the vainglorious bean of her fourth and latest husband, determined that young Hendrick, who had a bulge in his head, due more to affection than violence, should be set to work at some profitable calling. As Hendrick was born in a cellar and brought up in the dark, all his early training naturally tended to fit him for the discovery business. He was apprenticed to a regular follower of the discoverer's art and soon became quite proficent. The Dutch Government finally commissioned him to discover New York and bring home some authentic photographs of the bowery, a wild section of country which was just beginning to be appreciated in Europe.

The "Half Moon" had an uneventful voyage across the Atlantic, the only marring incident being the fact that she ran down and sunk three fishing boats on the Newfoundland banks and for this reason was afraid to visit Boston or New Bedford. Arriving off New York the visiting craft was boarded by old Chief Pork Barrel, who demanded fourteen puncheons of rum as a fine for Henry's infringement on the territory of the government shipping monopoly. Hendrick was never a very robust man and this blow weakened him considerable. He gradually sickened and died, and in accordance with his last wish his body was conveyed to Hudson's Bay on board the U. S. "A. T. Sherman" and dumped overboard with the highest military and naval honors. While the end of this simple, great, commanding and pure figure in our early history was very sad and untimely, those who were close at his bedside to the very last maintained that the thought that he might have discovered San Francisco instead of discovering New York was a great comfort to him and that only a few moments before the end he chuckled audibly over this great stroke of good fortune which had overtaken him in his youth. Hendrick Hudson does not at the present time hold any political position,—he is still dead.

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Shuffle them up again Mr. Congressman, let's all have a square deal.

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PACIFIC MARINE REVIEW

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J. S. HINES . . . . . Publisher
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PILOTAGE TO BE REDUCED.

TEN months ago the Pacific Marine Review started a campaign to secure lower pilotage rates at the port of San Francisco. It was the purpose of this magazine to demonstrate that the pilotage rates in force could be reduced materially and still leave an equitable income for the Bar Pilots' Association. With this end in view, a state-wide campaign was inaugurated and many newspapers throughout California took up the matter from the standpoint that excessive pilotage rates at San Francisco were bound to have a certain stunting effect upon the growth of the port. Greatly to the credit of the State press there was hardly a single criticism of the San Francisco Bar Pilots as a body or of the pilot service that has been and is being rendered at this port. It is only just that this should have been the case, as there is no doubt that the time-honored traditions of the pilots' calling have been fully sustained at San Francisco.

There has been exceedingly few, if any, well-grounded complaints anent the pilotage service on the San Francisco bar, and this, coupled with the fact that the Pilots' Association is composed of men who hold the respect and admiration of the community, has made the campaign on the rate question a peculiarly trying and disagreeable one for the Pacific Marine Review. With the efficiency, personnel or government of the pilots we had no quarrel—we merely contended that the rates should be lowered and that some further concessions should be made in regard to vessels calling for orders, repairs or in ballast. The disagreeableness of insisting upon a reduction was greatly increased by the dignified attitude of the pilots themselves while their rates were being attacked. In interviewing shipowners and shippers in regard to the pilotage situation at this port, the Pacific Marine Review found an amazing unanimity of opinion—all thought most highly of the pilots and of the pilot service, all thought the rates should be lowered.

Our differences with the pilots in this regard are now over and we are deeply thankful that they are over. The Pilot Association has agreed to a cut of 33⅓%, or from three dollars per foot draft and three cents per registered ton, to two dollars per foot draft and two cents per registered ton. This is a big reduction. The pilots are sacrificing one-third of their gross income, and their public-spirited action in this regard is certainly creditable. They have met the steamship owners more than half way, and this, too, when the movement of the class of ships paying pilotage is not very heavy. A bill is to be introduced at the State Legislature readjusting the pilotage rates, and the Pacific Marine Review sincerely hopes that the matter will now remain settled for years to come, and also that the end of the European war will witness an influx of foreign ships that will more than make up the amount of income which the pilots are now sacrificing.

A CASE IN POINT.

The Pacific Marine Review has already voiced its opinion on useless bidding, but since that time another example of the evils that may, and do, arise from the Governmental practice of calling for bids on small craft without making a hard and fast stipulation as to a limit price, above which bids would not be considered, has arisen. The use of a Navy Yard as a check upon the cost of doing Government work in private yards is theoretically correct, but in practice a hardship is often worked upon the private builder.

Those who favor placing all Government construction work in the Navy Yards claim that the Navy Yard estimate versus the private yard's tender constitutes fair competition. There are several bad flaws in this argument. The Navy Yard, its shops, wharves, power house, dry dock, etc., are all maintained by Government appropriations whether there is any work in the yard or not. Let us suppose that the yard manager tries to charge up to a certain job a fair sum for all machine tools used, a fair charge for insurance during the life of the work, a suitable management cost, a sinking fund proportionate to the size of the job and figured on the entire plant and add to this the lowest percentage of profit that a private concern that was very hungry for work might figure on and still the comparison of prices would not be fair to the private concern. Taxes have not yet been mentioned and taxes are an important item. The private yard is under heavy bonds while we have not heard of a Navy Yard furnishing bonds to guarantee the proper completion of the work. The trial trip is a much more expensive proposition to the private builder than it is to the Government. The Navy Yard assumes no risk, if repeated trials are necessary in order to fulfill the contract requirements the Government has to make up the deficit,—when such a contingency arises with a private concern the firm is either bankrupted or badly crippled financially.

It is apparently the Government's policy to use the ship yards as a gauge to set the prices in their own private non-interest paying establishments. The Lighthouse service, the Transport service and, in fact, all branches of the Government owning any floating property largely use the Navy Yard for their repairs and the private-owned yards to set their prices. After several firms have spent time and money making estimates, the lowest bidder is often told that his price is too high and the work will not be done. This was the case recently with a proposed boat for the Transport service and still later with a proposed oil barge for the river and harbor engineers. In the latter case the bids received ranged from $15,976 to $10,290. There were six bids, the figures given being the highest and the

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lowest. The lowest bid figures out at about 6 cents per pound, which is pretty low for a small job of oil-tight work. All of the concerns bidding were affected by slack times and were therefore eager to secure the work. All of these tenders were rejected as too high and the time and money spent on estimating was not only wasted, but went to swell an important item in overhead costs,—that of bidding without results.

We do not know what the Government officials would have considered as a fair price upon this work, but let us assume that in their estimation $9,000 would have been a reasonable price. Now if plans and specifications had been furnished the bidders with the strict understanding that no deviations from these plans and specifications would be tolerated and that no tender of over $9,000 would be considered, a rough, preliminary estimate would have convinced each of the six firms bidding on the work that they could not afford to handle it and there would be a resultant saving in expenditure for the bidding firms and a saving in time for the Government.

SEARCHING NEUTRAL SHIPPING.

The protest of the United States concerning the searching of neutral merchantmen and the detention of cargoes which are not strictly contraband, but which are open to suspicion of reshipment from the port of apparent destination to some point within the jurisdiction of an enemy power, offers nothing new in the way of international usages. In this connection, one Dutch writer asks whether Britannia is not only ruling the waves but also waiving the rules. In point of fact, the war situation and her attempt to starve Germany and Austria, as far as munitions of war are concerned, have forced upon Great Britain the necessity of adopting an American doctrine by presuming ultimate destination with reference to contraband of war.

Broadly speaking, there is no right of search of goods in a neutral ship destined for a neutral port, although the goods may be contraband. During our own Civil War a big contraband trade was opened up, goods being sent in neutral ships to West India ports and then transshipped into fast shallow draft vessels which ran the blockades which were maintained at all the Confederate ports. The Federal cruisers met the situation by seizing the neutral ships before they reached the neutral port, and it was successfully contended in the prize courts that the voyage of the goods, if not of the ships, was continuous from a neutral to an enemy's country despite the transshipment at a neutral port. The British Government, although British-owned ships and cargoes were greatly affected, did not protest officially against these decisions and, during the Boer war, the new doctrine was applied as against contraband sent to the Transvaal via Delagoa Bay.

Under the circumstances the American protest is decidedly open to diplomatic attacks. If we taught the dog to bite we must expect to feel his teeth now and then nibbling at our shins. Then, again, in the majority of cases, America has partners in her grievances. There are still very few American ships engaged in the foreign trade, and as a result a great percentage of the cargoes which have been held up under suspicion of their ultimate destination have consisted of American goods en route in foreign bottoms. The countries owning the detained shipping are not protesting nearly as vehemently over the detention of their ships as the American Government is over the detention of cargoes, and the apathy of the former is rather offsetting the nervous eagerness of the latter.

THE GOVERNMENT SHIPPING MEASURE.

If the proposed Government venture into the steamship business is carried through in anything like its original form there are very grave fears as to its success either as a paying business, a creator of trade or an equalizer of ocean freight rates.

As a business proposition, Government-owned ships will have a multitude of obstacles to overcome. If second-hand ships of doubtful antecedents,—and this will be the only class of ship offered for sale at anything like bargain prices,—are purchased, the fleet will consume far more than any possible profit through the tremendous cost of repairs and upkeep and at the same time prove utterly useless as an auxiliary fleet for the Navy. If, on the other hand, the vessels comprising the Government fleet are to be built according to Government specifications, fitted with suitable gun mount platforms with the extra scantling and stiffeners necessary to support same, then the first cost of these steamers will be very high. It makes little difference where these ships are built, that is, little difference as to price. With the present shortage of skilled workmen in Great Britain and the rushed condition of the shipyards, it is very probable that lower bids would be received for such vessels in this country than abroad.

Any attempt on the part of Government ships to build up a large trade must fail miserably unless the Government is going to back up its own line with a favoritism such as would bring federal prosecution upon any private corporation. The Navy Department has seen fit to break the coastwise laws of this country time after time by shipping great quantities of coal from one American port direct to another American port in foreign vessels. If the Navy Department can be operated entirely outside the laws of the United States, does it require much of a stretch of the imagination to picture a Government line of steamers operating on similar princples? If the Government is going into the steamship business either as a rate regulator or a producer of trade it is well that the legislators should understand that it will be necessary for them to expend money not in $10,000,000 lots, but in units that would make the Panama Canal appear to be a very trifling affair.

It is quite true that ocean freight rates, especially those maintaining on certain transatlantic routes are very high at the present time. Abnormal conditions have produced abnormal charges. In one sense, however, there is a certain measure of justice in these conditions. If the exporter of certain commodities is to profit by the European war, surely the shipowner has the same right, and this same shipowner is just emerging from several pretty lean years anyhow. When conditions have returned to normal, the tramp steamer will resume her old role as freight regulator and if the Government line is to meet tramp ship competition the loss on its operation is going to be very heavy.

Whatever form Government ownership in ship lines takes, the experiment will be watched with keen interest. Should the pending shipping bill become law it will be up to the Government to go at the matter in a really comprehensive way and spend hundreds of millions of dollars or else by studied inaction let the whole matter drift into oblivion.

The Hyde Windlass Company has closed a contract for windlasses, winches, etc., for the new battleship "California," which is to be shortly laid down at the New York Navy Yard.

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The Rubber Embargo

GREAT BRITAIN'S persistence in keeping up the embargo on the exportation of rubber, whereby the employment of 250,000 workmen in the United States is jeopardized, great investments of capital threatened and the people of the United States confronted with the probability of famine prices for rubber goods, is likely to become an important feature in diplomatic negotiations between Washington and London.

After British associations of rubber brokers and forwarders, rubber growers and all others interested have failed in efforts to have the embargo lifted; after committees of manufacturers in the United States have learned that the State Department at Washington is unable to obtain any satisfaction, the belief is growing that not only with rubber but with wool embargoes England is seeking to coerce the United States into some declaration or agreement which might be construed as a violation of strict neutrality in the war.

Admittedly acting well within her rights in placing the embargoes on all raw materials, England is seeing the crude rubber accumulating on her docks, with her rubber industry in a desperate condition as to finances, in order that concessions may be obtained from the United States in other things. Her exact intentions in this respect are not known.

Meanwhile crude rubber in New York is selling at from 87 to 91 cents a pound; in England it is going begging at 51 cents a pound. If this continues it means that the United States will pay next year about 100 per cent. advance on the prices of automobile accessories, druggists' sundries, articles of clothing, household goods and thousands of other things in the manufacture of which rubber is used.

American Agent Sails.

The sailing of D. G. Work of the Goodrich Rubber Company by the "Lusitania" for England recently was to enable the American rubber men to co-operate directly with the British rubber handlers in a new effort to have the ban lifted. The visit became necessary when, according to unofficial reports, the Washington Government informed the embargo committee of the Rubber Club and the Rubber Trade Association of New York that it was powerless to help. This is taken to mean that England's price for lifting the embargo is more than the United States can consider.

The embargo committee, which has visited Secretary of State Bryan as well as Sir Cecil Spring-Rice, the British Ambassador, several times, consists of George B. Hodgman, president of the Hodgman Rubber Company and president of the Rubber Club of America, chairman; William E. Bruyn of L. Littlejohn & Co., and president of the Rubber Trade Association of New York; Arthur H. Marks, vice-president of the B. F. Goodrich Co., and H. Stuart Hotchkiss, vice-president of the General Rubber Company.

The normal requirements of crude rubber by the United States for 1915 will be 65,000 tons. So long as the British Government maintains the present embargo there is only available for the United States about 35,000 tons from Brazil and 5,000 tons from other sources. Europe will take at least 7,500 tons of the Brazilian crop, regardless of price, so that the United States is confronted with a demand of 65,000 tons and an available supply of about 32,500 tons. The United States will be about 30,000 tons short and the other countries oversupplied to the same extent.

Since the Brazilian and African production will be absorbed mainly in the United States, the oversupply will be in the plantation products controlled by Great Britain. The Brazilian rubber will go to very high prices and bring great wealth to Brazil; the British rubbers will steadily decrease in value and finally cause tremendous loss to the producers.

Brazilian rubbers are steadily advancing and the British rubbers are generally falling off in price. However, the progress is not yet material, because American manufacturers are working from hand to mouth, hoping for the removal of the embargo. They are buying as yet only a fraction of their requirements from Brazil, preferring to shut down their factories rather than buy high priced rubber under the present uncertainty over the duration of the embargo.

Purchases Stored Abroad.

On the other hand, the drop in prices of British rubber is not yet severe because American manufacturers, hoping for a speedy settlement of the embargo, have continued to buy their usual quantities of British rubber, storing it in Singapore, Colombo, England and Canada for prompt shipment to New York when trade is resumed.

These conditions cannot exist much longer, rubber handlers assert. There is a limit to the amount of British rubber Americans can afford to finance and carry abroad, and that limit will soon be reached. As soon as American buying ceases the price of British rubber will fall to the point where British dealers and plantation owners will be confronted with ruin.

Americans will soon be compelled to decide whether to buy Brazilian rubber or close their factories. It is obviously dangerous, they think, to buy Brazilian rubber now at inflated prices because the embargo may be removed at any time. Then the price of this rubber will fall 50 per cent. and those who have bought will be at a great disadvantage over those who have waited. However, those who buy now will have a great advantage over those who wait in the event that the embargo stands.

The United States manufacturer is in a most difficult position. He ought to buy, but he dares not. He ought at this season of the year to be manufacturing heavily, but he hasn't the material. About one-half of the rubber workers are now unemployed and in need, but nothing can be done for them until the embargo is removed or stability given to the industry in some other way. It is safe to say that the number of unemployed will steadily increase if relief does not come soon.

Three Suggestions for Relief.

American rubber dealers and users have suggested that relief be provided in one of these three ways:

Removal of the embargo under proper guarantees.

Agreement by the British Government that it will not remove the embargo for at least six months.

Immediate action by the American Congress prohibiting absolutely the importation of British rubbers or products thereof or any kind of manufactured rubber goods into the United States.

Of these three measures the first is preferred by the manufacturers. It would restore the manufacturing industry of the United States and the crude rubber industry of Great Britain to a normal and healthy basis

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immediately and without the creation of hostility, the handlers say.

The second plan would at least give stability to the situation. American manufacturers could buy Brazilian rubber, knowing that our market would not shortly be flooded with cheap British rubber.

The third plan has been urged by those who believe that the motives underlying the embargo are ulterior and who are agitating for prompt retaliatory measures. This plan has not been officially presented at Washington, but has been unofficially discussed, and there is every reason to believe that if the industry cannot otherwise be protected from British attacks Congress will be quick to provide the needed relief.

Congress Resolution.

If favorable diplomatic or commercial action could not be obtained by January 10th, it was said, the matter would be presented to Congress in the form of a resolution introduced by an influential Representative and backed by many others.

It is difficult for those who are not familiar with the situation to understand why the embargo has not already been removed. According to authoritative statements made recently this is due to a lack of knowledge as to the real purposes of the embargo, which are:

To create rubber famine in Germany and Austria.

To benefit the rubber manufacturers of England and her colonies at the expense of those of the United States by creating such an overwhelming advantage in cost that not only must all foreign trade go to Great Britain, but perhaps even the home consumption of the United States.

To create pressure on the American Government to accede to certain requests of the British Government not pertaining at all to rubber.

The avowed purpose of the embargo is the one first stated—to create rubber famine in Germany and Austria. In view, however, of the fact that the American industry has repeatedly signified its readiness and willingness and ability to protect Great Britain's interests in this respect and that it has been impossible, after two months of constant effort, to secure even an intimation from the British Government as to the character of the guarantee desired, the first purpose must be dropped from consideration. It has no bearing on the situation to-day, dealers assert.

Whether the welfare of the British manufacturers was taken into consideration or not, the result is that the British manufacturer to-day buys his principal raw material for one-half what the American pays. In competition for foreign business, under those conditions the United States manufacturer will soon be a negligible factor. Even his home market will be entered and taken from him, because the import duty of 12 per cent. is no protection against the difference in cost which now exists.

Advantages to Canada.

The rubber manufacturers of England, France, Canada and Australia will soon flood this market unless relief is arranged, the rubber men say. Even now preparations are under way for manufacturing extensively in Canada for importation into the United States by those manufacturers of the United States who have factories in Canada. Others will be compelled in self-defense to establish Canadian factories.

While this condition may not be the result of a definite purpose, still it exists, and the manufacturers of the United States, according to the trade leaders, should realize how effectively they are attacked and should demand adequate protection for their home market at least.

The third reason given above is considered as the most potent in the matter of the embargo. While the officials at Washington will not discuss these problems freely, this is known: England is withholding by embargo certain materials which are needed in the United States. Certain materials other than rubber, produced in the United States, are reaching the enemies of England, much against her wishes, but in accordance with international law. In endeavoring to make it expedient for American exporters to export these materials, England encounters the objection of the United States Government. Apparently, if the United States would waive its objections the British Government would raise the embargo.

Rubber manufacturers said recently that the solution of this problem can only be the result of a clear and frank understanding of all the issues involved. If the British Government will not even discuss the lifting of the rubber embargo on the basis of adequate protection against exportation of rubber and its products to Germany and Austria, they said, this will be evidence enough that she has some other object in view.

The two new steamers for the Osaka Shosen Kaisha's Puget Sound-Orient service which are building at Kawasaki, Japan, will have a speed of seventeen knots and a displacement of 18,000 tons. They will be named the "Manila Maru" and the "Hawaii Maru," and will replace two of the slower boats now used on this route.

The Standard Oil Company has ordered two steamers of 550 feet length and a deadweight capacity of 15,000 tons from the Newport News Shipbuilding and Dry Dock Company.

The Allan liner "Alsatian" has been chosen by the British Admiralty as the flagship of the British Mercantile Cruiser Squadron, which is under Admiral de Chair. The "Alsatian" has been fitted with eight 6" guns and a secondary battery of quick firers.

Some time in May a splendid new liner will join the fleet of the Canadian-Australian line. This craft is building at the Fairfield Shipbuilding and Engine Company for the Union Steamship Company of New Zealand and will be even a larger and a finer vessel than the present flagship of the fleet, the "Niagara."

The following table shows the number and nationality of vessels entering the ports of French West Africa during the years 1912 and 1913:

Nationality—	1912.	1913.
French	837	862
British	851	807
German	497	473
Danish	30	32
Swedish	27	28
Norwegian	48	113
Belgian	98	105
Portuguese	19	33
Italian	179	240
All others except U. S.	62	68
United States	0	0
Totals	2648	2761

It is very gratifying to note in respect to the number of clearances and entrances at these ports that, while Germany and England both show a slight decline, the United States held its own.

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Pacific Coast Shipping Notes

SEATTLE.

J. F. Duthie and Company are busily at work on a stern wheel cannery tender for the Northwestern Fisheries Company. This interesting craft will be of the Columbia River type of construction and will be operated over the mud flats at the mouth of the Copper River. The new craft will be 120 feet long by 30 feet beam and 5 feet depth of hold. Crew accommodations are located on the upper deck and storage for 100 tons of fish is provided on the main deck. A locomotive marine type boiler with 1800 square feet heating surface will provide steam for the 300 horse-power propelling engines and also for a small electric light plant. Tanks are provided for fifteen tons of fuel oil and 10 tons of fresh water. The boat is to be completed by March 15th.

The Great Northern steamer "Minnesota," which was withdrawn from her regular route last September, has been placed on berth to resume her former trade leaving Seattle on February 6th. The withdrawal of the "Minnesota" gave rise to many rumors as to her disposition and she was reported several times as having been chartered or sold to the English Government. The vessel will call at Yokohama, Kobe, Nagasaki, Manila and Hongkong. It is believed that the large offerings in way of cotton shipments induced the Great Northern Railroad Company to place the "Minnesota" in commission again.

A controlling interest in the Northland Steamship Company has been purchased by the Border Line Transportation Company. These amalgamated interests will be under the direct management of Dodwell and Company of Seattle and this marks the return of this concern to the Alaska trade after an absence of ten years. By the terms of the transaction the ownership of the steamer "Al-ki" and the freighter "Northland" is transferred to the "Border Line" and in conjunction with the steamer "Despatch" will be operated in the southeastern Alaska service.

While the Border Line Transportation Company is comparatively a new line, having been organized less than two years ago for the Seattle-British Columbia trade, the firm of Dodwell & Co. is not new to the Alaskan trade. During the rush to the Klondike in 1897 they operated the Washington and Alaska Steamship Company and during the Nome rush they also ran a line to the Bering Sea port.

Dodwell & Company formerly owned the steamships "Victoria," the famous northern liner of the present Alaska Steamship Company, and the "City of Seattle," the passenger liner of the Pacific Coast Steamship Company. They also owned the steamships "Olympic" and "Tacoma" as well as the old "Farralon," and other vessels, famous in early Alaskan transportation days which have long since passed away. Ten years ago the entire Dodwell Alaska interests were sold to the Northwestern Steamship Company, which amalgamated with the present Alaska Steamship Company, and to the Northern Pacific Railway Company. This was under an agreement not to enter the Alaska trade for ten years.

A. F. Haines, who is local manager for Dodwell & Co., is also manager of the Border Line Transportation Company and will have active charge of their new interests, locally and in the north. He announces no change in the British Columbia service, with the exception of the withdrawal of the "Despatch."

In discussing the recent navy tests of Alaskan coals and the effects of the satisfactory reports submitted by the naval engineers, Mr. H. F. Alexander, president of the Pacific-Alaska Navigation Company, said: "Within two years the activity resulting from the opening of the Alaska coal fields, the settlement of the vast valleys of Alaska and the projection of great mining propositions will astonish the Coast. The Navy tests place at the disposal of the Government a coal supply without limit. They show that the Matanuska coal fields possess a better coal than that now being used by the vessels of the Pacific fleet and the supply is so abundant that there need be no fear of a scarcity. It should be possible to land this coal at Puget Sound ports at a rate not to exceed by over two dollars a ton the price of coal in New York."

The coaling of our Naval vessels on the Pacific Coast has always been a sore spot with the western representatives in Washington, D. C. The coaling of naval vessels has been rather expensive on the Pacific owing to the transportation of all the coal from the East. The discovery and opening up of Alaskan fields possessing coal equal to the "New River" product, aside from its commercial value as a future governing factor in coal prices on the Pacific Coast, should create a large reduction in the Navy's coal bill and at the same time permit of the building up of large reserve supplies at all the Navy bases on the Pacific. If the Alaskan coals are to fulfil entirely Mr. Alexander's optimistic predictions it will be interesting to note just how far south the influence of the new product will extend, that is at what point on the coast will a high grade Alaskan coal be the same price as a high grade eastern coal? Another interesting conjecture will be the possibility of the appearance of a high grade coal at a reasonable cost curtailing to a certain extent the use of oil-burning steamers on certain routes.

The Pacific-Alaska Navigation Company at the last Board of Directors' meeting added the name of Henry T. Scott to the directorate. The Board of Directors of this concern as it now stands is an exceedingly strong one, consisting of H. F. Alexander, Chester Thorne, S. A. Perkins, M. A. Arnold, J. D. Hoge, Theodore B. Wilcox, E. A. Stuart, D. C. Jackling, Henry T. Scott and William Jones. Mr. C. W. Wiley, manager of the company, has

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resigned to enter business on his own account, and the Navigation Company thus loses the services of one of the most efficient and well-liked traffic men on the Coast. Mr. Wiley's place will be occupied by Mr. R. J. Ringwood, who is promoted from the position of Traffic Manager to that of Manager. Mr. Ringwood, though young in years, is old in the steamship business. After ten years with the Pacific Coast Steamship Company, he entered the Pacific-Alaska Navigation Company's office. His ability was noticed at once and his rise has been remarkably rapid.

C. W. Wiley, general manager of the Pacific Alaska Navigation Company, which conducts the "Admiral Line," with headquarters at Seattle, has resigned his position. He will enter private business and has been succeeded by R. J. Ringwood of San Francisco. The position of traffic manager, formerly held by Mr. Ringwood, will be abolished, and M. F. Cropley, assistant traffic manager, San Francisco, will be promoted to the office of general agent at that point.

The special board of United States Engineers which recently investigated conditions at Grays Harbor, Wash., submitted its report to the United States Board of Engineers for rivers and harbors at Washington, and recommended the continuation of the jetty work. The sum of $560,000 for the north jetty, $870,000 for the south jetty, and $450,000 for the construction of a sea-going dredge to be used in keeping the channel clear, was recommended.

The Washington State Public Service Commission is seeking to have its power extended to the extent of that enjoyed by similar commissions in other States in the matter of certificates of convenience and necessity. The law which it seeks from the Legislature will provide that no public service corporation shall begin the construction of a line or system, or its extension, without first obtaining from the commission a certificate that the present or future public convenience and necessity require, or will require, such construction.

The Seattle Construction and Dry Dock Company is carrying out extensive alterations and repairs on the Alaska Steamship Company's steamer "Northwestern." An awning deck is being provided for and a complete refrigerating plant installed. The work will cost in the neighborhood of $60,000.

Under the supervision of Mr. W. H. Alison, superintending engineer for the Pacific Coast Steamship Company, the coasters "Governor" and "President" have undergone some alterations at their recent annual overhaul. The stacks of both vessels have been shortened and additional accommodations for first-class passengers have been provided.

The "Admiral Evans," which struck Bird Reef at the entrance of Port Graham on December 13th, was docked and repaired about the first of the year at the Seattle Construction and Dry Dock Company's plant.

The big Smith Cove pier, one unit in Seattle's extensive waterfront improvement project which is now nearing completion, has been opened for business and the Luckenbach Steamship Company's steamer "Evelyn" was the first vessel to use the lengthy pier commercially.

The 49th semi-annual report of the Nippon Yusen Kaisha on the whole makes a very favorable showing. Eastbound freights fell off through the year, but the passenger business was exceptionally good. The following is the summary of accounts for the last half-yearly period: Net profit, 2,273,640 yen; brought forward from last term, 974,639 yen; to reserve, 113,682 yen; to expansion and improvement fund, 300,000 yen; establishment and repair of terminal facilities, 500,000 yen; special reserve, 300,000 yen; bonuses to officials, 110,000 yen; ten per cent. per annum dividend, 1,100,000 yen; carried to next term, 824,597 yen.

The company employed 86 of its own vessels and over ten chartered vessels; the cargo carried amounted to 2,040,000 tons, the passengers 185,000.

The two latest vessels to be added to the fleet were the "Fushima Maru," of 10,000 tons, and the "Tushima Maru," of 7000 tons. Five other steamers averaging 7000 tons each are now under construction at Japanese yards for the Nippon Yusen Kaisha.

On October 24, 1914, the American steamer "San Francisco" cleared from Buenos Aires. As far as is known she is the first American merchant steamer that ever sailed from the great South American metropolis.

Fire damaged the new Hanford-street dock of the Seattle Port Commission to the extent of $5,000, January 16th. The only other damage inflicted was to the United States Coast Geodetic Survey vessel "Gedney," which was tied up to the dock when the fire started within six feet of it, but was saved by the prompt action of her sister-ship, the "Explorer," which towed her to safety.

The dock has been completed for some time and was to have been turned over to the Port Commission February 1st by the contractors, Harrington & Peters.

The overturning of a bucket of hot roofing pitch was the direct cause of the fire. This ignited the railroad extension of the pier and from this the flames jumped across to the creosoted piling of the pier.

At first the structure seemed doomed, but when the creosote had been well burned out of the piles, the logs did not ignite so rapidly, and the firemen soon had the blaze under control. The fire made no impression on the heavy flooring of the building and was confined to the inflammable creosote which it sucked from the piles.

R. E. McDonald, the Pacific Coast Steamship Company's agent in Vancouver, B. C., visited Seattle recently on company business.

Pacific-Alaska Steamship Company's S. S. "Admiral Watson," after undergoing extensive alterations at the yards of the Seattle Construction & Drydock Company, has resumed service between Seattle and Southeastern Alaska points.

The trial cup defender, "Defiance," has been sold as junk, bringing according to reports only $6,500.

PORTLAND.

Mr. Pennell is well known up and down the coast among shipping men, but perhaps some of his friends have not heard how he unwittingly attended to disposing of his own salvage. Mr. Pennell was strolling along the wharf at St. Johns one warm afternoon. Near the edge of the wharf he spied a large bed-sheet in the center of which reposed a panama hat, several bottles of ginger ale, some lemons, sugar and a table tumbler. The day was very warm and the articles reclining peacefully in the sheet were rather suggestive. The idea of a "Horse's neck" was peculiarly appealing to Mr. Pennell at this particular moment and he was soon cooling his throat with a delicious drink. After continuing his stroll he returned once more to the vicinity of his late inspiration and beheld a small boy using the panama hat as a model yacht. Mr. Pennell was mildly indignant at this misuse of some poor stranger's wardrobe and asked the erring youth why he took such liberties with a stranger's property. "Why Mr. Pennell," replied the youth, "This hat

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ain't no stranger's property, it's yourn. It and that other truck in the sheet is all that I saved."

"Saved!" cried the bewildered Mr. Pennell. "Saved from what, my boy?"

"Why, saved from your bungalow. It just burned down and what's in the sheet is all there is left."

The Willamette Iron and Steel Works have secured the contract for building the engines for a stern wheel steamer for Puget Sound service. J. F. Duthie & Company will construct the hull at their Seattle yard. The contract for the hull amounts to about $30,000.

New machinery is to be installed in the new steel hull recently completed for the "Port of Portland." It was the original intention to remove the machinery from the old dredge "Columbia" and place it in the new hull, but the cost of this almost equaled the cost of new machinery, so the Port Committee finally decided to have both the old and the new hulls capable of doing dredging.

Captain Thomas W. Garlick, for the past five years Master of the Hill liner "Minnesota," has accepted the command of the new Astoria-San Francisco coaster "Northern Pacific."

Results of a recent Government bar survey showed an extreme bar depth of 32 feet in the South Channel with 30 feet 5 inches for a distance of 1,500 feet from the end of the South jetty. These results are most encouraging and would appear to indicate that a through depth on the Columbia of 30 feet would soon be an accomplished fact.

Mitsui & Company have removed their Portland office from the Lumber Exchange Building to suites 702 and 703 in the Wilcox building.

SAN FRANCISCO.

The British steamer "Mexico City," under charter to the Robert Dollar Company, recently left this port en route for Vladivostok and Oriental ports. This is the first vessel to go direct from San Francisco to the Siberian port in several years.

It is considered certain that the Peruvian Steamship Company will enter the San Francisco-West Coast trade with regular sailings about March 1st.

The Holland-America Line will shortly extend their line from Rotterdam to San Francisco via the Canal. Their ships will touch in both directions at Curacao, which seems destined to become the leading distributing point for West Indian imports.

Drew Chidester, who for the past fifteen years has been identified with the Tacoma office of Dodwell and Company, has been promoted to the position of general manager for California of the Blue Funnel Line. Mr. Chidester is making his headquarters in San Francisco. The first steamer from Europe via the Panama Canal in the Blue Funnel service is due in port within a day or two.

Swayne & Hoyt announce that they have accepted the general agency on this coast for the Oriental-Pacific line of steamers, a newly organized corporation formed for the purpose of maintaining a regular monthly service between Oriental ports and San Francisco. The first steamer to be dispatched for this side will be the "Tacoma," of 11,000 tons deadweight capacity. The vessel will load at Calcutta up to January 20th, Hongkong February 6th, Manila February 12th, Kobe February 21st, and Yokohama February 23rd.

Sam Williams, a veteran purser with the Pacific Mail, Toyo Kisen Kaisha and other lines, is now in the East preparatory to coming out as purser of the new Astoria coaster, the "Great Northern."

Chas. C. Moore & Company, engineers, and agents for the Babcock & Wilcox Company, have moved their office headquarters to the Sheldon Building, corner First and Market streets, San Francisco.

The "Princess Margaret" and the "Princess Irene," one practically finished and the other nearly so, have been requisitioned by the British Admiralty and for this reason their appearance on this Coast will be indefinitely delayed. These two vessels will probably be utilized as troop ships for cross-channel runs as they are admirably adapted to such work. The "Princess Margaret" and "Princess Irene" were fully described in the January number of the Pacific Marine Review.

The British steamer "Azov," which struck a reef near Talara on October 30th, and sustained considerable damage, has been hauled out for repairs at the Yarrows Yard, Esquimalt. The "Azov" is a two-deck tank steamer with machinery located aft and is of 1512 tons register.

According to the report of the United States Commissioner of Navigation, the State of Washington is the second State in the Union in the number of vessels engaged in trade of more than five tons carrying capacity, and that during the fiscal year ending June 30, 1914, it led every State in the Union in the number of vessels built, and had documented more vessels than any other State except New York. The Pacific Coast has 4,778 vessels engaged in trade, and Puget Sound furnishes more than 53 per cent. of this total, California coming second with 932 vessels. Segregating steam vessels from those carrying sail, New York leads with 1,676, while Washington is second with 1,334, and California third with 836. Pacific Coast tonnage aggregates 36,420 tons and that of Puget Sound 16,366 tons.

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European Marine Notes

British Shipowners' Good Businesss.

To British shipowners the war has after all brought unexpected good fortune. It is true they were rather chary about sending their ships to sea at first, but when the risks were reduced to a minimum they came forward readily, and now they find shippers eager to secure freight-room at rates which a few months ago seemed past hoping for. The Government, of course, has called for a great many vessels for the transport of troops and stores, and as all the great mercantile fleet of Germany was either captured or driven to seek refuge in port, it became evident that the supply for trade purposes was no longer adequate. The Americans have lately been seeking neutral ships in which to send cotton and other supplies to Germany, but the view here is that they have suffered some disappointment. British and French ships, of course, neither could nor would undertake such work, and when Germany's also are not available there is very little left.

Good Freights Ruling.

At the moment there is a tendency for shipping freights to recede a little after the notable recovery which has recently taken place. How great that recovery has been may be gathered from the fact that from $3.12 per ton on the Argentine route a few months ago, the figure has now risen to something like $7, this extraordinary movement being due to elimination of German competition. Similar advances have taken place in other parts of the world, with the result that shipowners are no longer apprehensive regarding their prospects, for while it is true that expenses are at a higher level than usual, and particularly in connection with insurance charges, most of the regular lines are now doing very well, while a similar remark applies to tramp owners. Another important factor tending to help the shipping industry as a whole is the large sums which have recently been paid by the Government under their contracts for war transport work. These disbursements have proved of material assistance to some of the largest shipping organizations. With the elimination of the Hamburg-Amerika Line from the world's ocean trading business the Royal Mail Steam Packet Company is easily the largest concern of its kind in existence, and the improved conditions which have recently come into force are probably proving of more immediate benefit to that great undertaking than to other and smaller shipping companies. To what extent the Royal Mail Company has benefited it is impossible to say; it is quite possible that when the accounts of 1914 are made up the Ordinary stockholders will find that, although they received no interim dividend in respect of the current year, their position as regards the entire twelve months will not be much below that of 1912 and 1913, for both of which years six per cent. was forthcoming.

German Shipping Troubles.

Evidence is accumulating which shows that the position of most of the German shipping companies could not be much worse, and, in fact, even if the war came soon to an end, very few of them would be able to resume operations. An amalgamation of the stronger concerns is, therefore, proposed as the most likely way of overcoming the difficulty with which they will shortly be faced. The losses already through the seizure of ships and inability to trade is estimated at over $500,000,000, and the longer hostilities continue the heavier will be the charges for laying up at home and neutral ports. In connection with the movement to capture Germany's maritime trade, plans are being formed by Belgian firms to transfer the whole of their future overseas shipments to British steamship lines, several of which already have been approached in the matter. Before the war German vessels did a huge carrying business to and from Antwerp.

Many New Shipbuilding Contracts.

Shipowners are quite obviously anticipating plenty of employment for cargo steamers in the comparatively near future. They have placed during November an exceptionally large number of new contracts—almost wholly for vessels of the cargo-carrying type. On the Northeast coast of England orders for about 40 steamers have been reported recently, while on the Clyde alone there have been announced during November orders for 25 vessels of about 120,000 to 130,000 tons gross. There have also been recently a number of orders which are not being reckoned as new work just at present, as well as a good many unconfirmed rumors—some of which were doubtless true enough—so that the real November measurement of new work on the Clyde is probably not far short of 200,000 tons. In this respect the month seems to be absolutely unprecedented. There is also a splendid market for new tonnage for sale on the stocks or almost completed, and for good second-hand tonnage. Freights continue good and the war prospects are steadily becoming brighter. What the trade conditions will be on the close of the war no one can say definitely, but British shipowners evidently believe strongly that the British mercantile marine will be in a more predominant position than ever, and will carry an even larger proportion of the world's traffic than it did previous to the hostilities. The throwing back on the freight markets of the tonnage at present chartered by the Government, together with completion of the huge amount which is now being ordered, may—if the circumstances synchronise—bring about poorer times for owners; but it must be remembered that very

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little has been done for a good many months back in the way of ordering new tonnage, and that nothing whatever has yet been done to make good the mercantile wastage due to the war. The ultimate disposal of all the war captures has also to be taken into account, but even considering these there is no reason to believe that the trade of the world will not be sufficient to provide employment for all the tonnage likely to be on the register of the United Kingdom about a year hence.

Many Oil-Propelled Ships Coming.

Nowhere better than in the annual report of Lloyd's Register of Shipping can the trend of shipbuilding developments be seen in true perspective. One of the most important tendencies to be noted is the increasing employment of the oil engine for ship propulsion. This has made it necessary not only to frame special rules for the construction and survey of Diesel engines and their auxiliaries, but to include in the register book a separate list of ships in which internal combustion engines have been fitted for propulsion. Counting vessels in course of construction, about 90 vessels fitted with oil engines are classed with Lloyd's. Of this number nearly 50 have Diesel engines, representing a total horsepower of 100,000. In connection with the oil engine ships, the report makes reference to vessels now under construction intended to carry oil in bulk and specially strengthened with the object of supplying warships with fuel oil at sea. It may be pointed out that as the result of an investigation carried out by the Chief Engineer Surveyor of Lloyd's it has been necessary to revise the rules in order to make compulsory the use of oil fuel the flash point of which is not lower than 150 degrees Fahrenheit. The rules, however, have been relaxed in certain instances where proper provision has been made for the safe employment of oil having a lower flash point.

Will War Prizes Be Used?

There was an incident on the Tyne a day or two ago of a significant nature, bearing on the question of the scarcity of tonnage at the present time, which lends color to the suggestion that some of the merchant prizes of war may be utilized for carriage of merchandise. Since the outbreak of war the German steamers "Albert," "Clement" and "Henry Furst" have been held up at Tyne dock. They have just been removed to the open river near to ship-repairing works, which would appear to indicate that they may be got under way shortly, and be engaged in the coal-carrying trade. Whether these German ships, if utilized, will be run by private enterprise or otherwise is an open question. As an evidence of the scarcity of British tonnage, the Scandinavian steamer "Joachim Brinch Lund," now in the Tyne, has been fixed at $5 per ton for a coal cargo to the Mediterranean—a record freight.

MARINE MISHAPS.

"ISTHMIAN." Struck a submerged rock at the north end of San Benito Island on the 18th of December at 4:20 a. m. Thick, squally weather prevailed. The fore peak and number one hold were flooded but by skilful maneuvering Captain Ryer succeeded in backing his ship out of danger. The "Isthmian" succeeded in making San Diego by 6 p. m. on the 19th.

"MALAKKA." The Danish motorship "Malakka" ran ashore in a sheltered cove on one of the Natividad Islands within twenty-five miles of the grounded "Isthmian," the two mishaps happening within an hour or two of each other. These two accidents are of peculiar interest and the investigator's findings will be eagerly awaited. Both vessels were off their course at the same time and the question of affected compasses is a striking possibility. The "Malakka" is hard and fast but in a well sheltered position, but nevertheless will probably prove a total loss.

"COOS BAY." December 19th at 6 a. m., the steamer "Coos Bay" in attempting to make her usual landing at the Ventura wharf, had her bow thrust under the wharf by a heavy swell. Both the wharf and the steamer were badly wrecked, the latter presenting little chance for salvage with the exception of the engines, which may be saved.

"WILLIAM CHATHAM." The steam schooner "William Chatham," bound to Portland from Tacoma, ran ashore shortly after midnight December 20th on Marrowstone Point. She grounded at extreme low water and was easily floated with the rising tide three hours later. The "Chatham" returned to Seattle for survey, but her injuries were negligible and she resumed her trip to Portland. She was under charter to W. R. Grace and Company and had 1,400 tons of flour aboard.

"EUREKA." The steamer "Eureka," on voyage from San Francisco to Ventura, while passing out through the north channel was struck by a curling sea which swept over her fore and aft and tore the housing away from the engine and boiler room hatch. Some of the wreckage fouled and broke the main steam pipe, the vessel lost headway and sloughed around in the trough of a rather heavy sea. She drifted broadside on to the rocks at Point Bonita and became a total loss. The wreck occurred at dusk, January 8th, and one life, that of Second Officer James Bolger, was lost.

"OREGONIAN." The American-Hawaiian steamer "Oregonian" grounded on Mormon Island in San Pedro harbor while leaving that port on the night of January 13th. The vessel's rudder was damaged. She was brought to San Francisco for drydocking and survey.

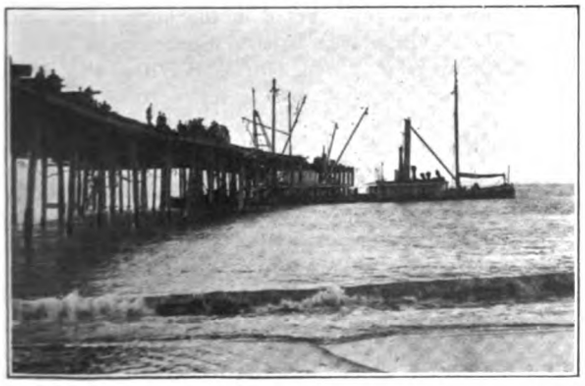
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Marine Insurance in 1914

THE YEAR has been one of conflicting interests for Underwriters, as since the outbreak of hostilities at the beginning of August Underwriters have been compelled to give a very large amount of attention to war risks. In addition to this, trade has been diverted very considerably into different channels, so that Underwriters have not been able to secure the average of business to which they are accustomed. As an instance of this we may mention the closing of the Baltic to British and Russian steamers, and the enormous development of the trade between the United Kingdom and the White Sea during the autumn and winter months. A large trade has also been done for shipments across the North Atlantic, and several boats have been pressed into this trade which Underwriters consider were not only not suitable, but were a distinctly hazardous risk for voyages in the winter.

One effect of the war was the disappearance of German companies from representation in Great Britain or its colonies. The result of this was that British Underwriters were enabled to advance rates in many quarters. This advance was, of course, necessary in view of the more hazardous character of navigation owing to the extinction of lights and other aids to navigation, but the cessation of competition from German companies enabled the arrangements to be carried through. The result was that various tariffs were formed, among which we may mention the tariff for shipments of piece goods from the United Kingdom to India and the Far East, and a tariff for shipments of grain from the River Plate to Europe. The latter is the first attempt that has been made towards the formation of a tariff in this business, and it is to be hoped the results will be satisfactory. The tariff for shipments to the East marked an advance of about 25 per cent. on the previous rates, and the tariff for shipments of cotton from Egypt to Europe was also advanced by about 30 per cent.



The Coos Bay under the wharf at Ventura.

Towards the close of the year various fleets of steamers were renewed, and it was interesting to notice that the rates paid were frequently higher, but were certainly not below those paid in the previous year. So far as can be seen hull Underwriters are likely to do well out of the business, because there are certain considerations which are likely to be helpful to them. In the first place, a large number of vessels were captured and sunk, or arrested in German ports, or sunk by mines. It is quite within the range of probability that many of these steamers would make average claims which will not now be paid. On the other hand, Underwriters have received the premium for the insurance for twelve months, and with the law as at present understood, owners cannot claim any return, even though the vessel may have been at risk only for a few months at the time of the capture or loss.

Some of the most serious losses of the year have fallen on American business. The heaviest loss was, of course, that of the "Empress of Ireland," which roughly cost underwriters $2,500,000. Another heavy loss was that for the abandonment of the tank steamer "Oklahoma," which was valued at $600,000, and the loss of the Royal Mail liner "Cobequid" in the Bay of Fundy entailed claims for $400,000. In addition to this, there were some heavy claims for losses on vessels through fire or explosion. Among these may be mentioned the "Norfolk," destroyed near Melbourne ($750,000), the "Shirley," abandoned on fire in the China Seas ($620,000), the "Foxton Hall," lost by explosion with a nitrate cargo ($500,000), the "Columbian," abandoned in the North Atlantic owing to explosion and fire ($225,000). Apart from these, the "Santa Cecilia" had a bad fire in January, and the "Santa Catalina" a bad fire in October.

It is worthy of remark, however, that the American Lake business has gone wonderfully well during the season, and the claims will be much lower than has been the case for very many years.

In the overdue market quite a number of vessels arrived after high rates were paid. Up to 85 guineas was paid on the French sailing ship "Cotentin," while 80 guineas had been paid on the "Pennoil," "Wildenfels," "Kwasind," "Siberia," "Newfoundland," and "Kyno," before their arrivals were reported. In the cases of the "Wildenfels" and "Siberia" the high rates were paid owing to wireless messages which turned out to have been misunderstood. In December 60 guineas was paid on the "Rio Colorado" before her arrival in New York, but this rate included war, as well as marine

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risk. On vessels ashore there were also a number which got off after high rates had been paid. For example, up to 90 guineas was paid on the "Aberlour" "Gothland," "Haddonhall," and "Emma," and 85 guineas on the "California." The "Camoens," which got ashore at Bermuda, reached 75 guineas before she was floated. Salvage operations of an unusual character were successfully carried out in the cases of the "Gothland" of the Red Star line, and the "California" of the Anchor line. The "Gothland," which was ashore off Scilly, was floated most opportunely and after being tightened was taken to Southampton by Captain Young of the Liverpool Salvage Association, with the fore part of the vessel entirely cut away by the rocks for about 70 feet, the ship being kept afloat by compressed air. Operations on the "California," ashore off Tory Island, were of a very protracted character, lasting nearly three months before the vessel was eventually floated and taken to Glasgow.

Naturally the insurance of war risks has loomed very largely during the last five months of the year. In the week preceding the war rates in London advanced rapidly, and on Friday, the 31st of July, the rates quoted in London against war risks were as follows:

By British steamers to or from the East to the United Kingdom 3%, or if via the Continent, 5%.

The rate for French, German, Russian, or Italian steamers to or from the East was 10%, while for other nationalities it was 4%. It will therefore be seen that Underwriters did not take a strong view as to Great Britain being drawn into the conflict. When business opened in the following week, it was of course known that Great Britain would be involved, and war risk business practically ceased for a couple of days. The British government, however, established a war risk department to cover shipments by British steamers at a flat rate. This was fixed at 5 guineas, which within a short time was reduced to 2 guineas. This rate remained fixed for about two months, until it was reduced to 1½ guineas in the middle of December. In the same way the Government arranged to insure hulls for a period of three months, or for a round voyage, at a rate of 2%, which has since been reduced to 1½%. In the case of cargoes the Government received the whole of the premium, and paid the whole of the loss. In the case of hulls the insurance had to be effected with one of the steamship owners' war risks associations, and the Government indemnified the association to the extent of 80% of the loss.

Taking everything together, Underwriters have done exceedingly well out of war risks, because they were nearly always able to secure first-class business at rates below those charged by the Government, and handsome profits are understood to have been made. Although there were a large number of vessels captured and sunk, a careful study will reveal that Underwriters adopting the usual principle of limiting their line on each steamer would not be very badly punished by any particular loss. It is interesting to notice that four of the British vessels sunk by German cruisers had cargo for American account, and so far as can be ascertained, the bulk of the war risk insurance was also effected in the United States. These steamers were the "Bowes Castle" with nitrate, the "Indian Prince" with coffee, the "Charcas" with nitrate and ore, and the "Vandyck" with coffee and general cargo.

There were several changes in underwriting circles during the year. With the commencement of the year Mr. E. L. Jacobs succeeded Mr. R. A. Ogilvie as Underwriter of the Marine Department of the Alliance Assurance Company. At the end of September Mr. T. J. Storey, the London Underwriter of the British and Foreign Marine Insurance Co. retired, and was succeeded by Mr. W. E. A. Williams. At the end of December, Mr. James Shaw, London Underwriter of the Union Marine Co. retired, and was succeeded by Mr. H. T. Bagnall. In the spring of the year the shares of the Maritime Insurance Co., of Liverpool, were secured by the Scottish Union and National Insurance Company of Edinburgh, but the business was continued on similar lines to that of other marine companies whose shares are controlled by the large fire companies. There are now six marine companies whose destinies are in the hands of large fire companies. With the close of the year it was notified that the British Dominions General Insurance Co., Ltd., had taken over the business of the North Western Insurance Co.

ISHERWOOD SYSTEM OF SHIP CONSTRUCTION.

The Isherwood system of ship construction during the year 1914 has again made marked progress. The total number of ships now built and being built is 315 with an aggregate gross tonnage of about 1,480,983.

The total number of vessels launched during the current year is 45, representing about 274,990 gross register tons.

That this system can be applied with advantage to all classes of vessels is evidenced by the following analysis of the boats already built and now on the way:

Cargo vessels.....	129	representing about	574,337	gr. tons
Oil tank vessels...	125	" "	666,180	" "
Colliers	20	" "	119,288	" "
Passenger vessels...	9	" "	27,769	" "
Gt. Lake freighters	13	" "	83,873	" "
Barges	16	" "	8,206	" "
Dredgers	2	" "	760	" "
Trawlers	1	" "	570	" "
	315		1,480,983	

The most notable vessels built during the year include five more huge oil tankers of the 15,000 tons d.w. type, 3 more large freighters for the American Lake trade, and special interest also attaches to the "W. Grant Mordon," built on the Canadian Lakes, as this vessel is probably the largest bulk freighter at present afloat throughout the world. With the addition of this vessel, the Isherwood fleet has now the distinction of including the largest oil tank vessel and cargo vessel afloat.

Vessels have been constructed to the highest classification of Lloyd's Register, British Corporation, Bureau Veritas, Germanischer, Lloyd, Norsko Veritas, and American Bureau, and the system has for certain classes of vessels been adopted by the Governments of Great Britain, United States of America, Italy, Russia, and France.

The new river and bay steamer "Petaluma" was launched at Benicia on January 2nd and is now regularly employed on the San Francisco run. The "Petaluma" is a stern wheeler 170 feet long, 38 feet beam and 480 gross tons. She was built to replace a similar boat of the same name which was destroyed last March by fire.

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The "Sir Tom," winner of the Lipton cup at Seattle, July 15 last. Curtis and Miller Photo. This yacht was painted with Von Hoveling's bottom composition.

With Those Who Do Things

The Von Hoveling American Composition Company report a busy and prosperous year's business during 1914. Over 2,000,000 tons of shipping in the United States alone had Von Hoveling bottom compositions applied. This is a very large amount of painting. Among the Pacific Coast lines upon which Von Hoveling's compositions were used during the year were the American-Hawaiian Steamship Company, Seattle-Tacoma and Spokane Railroad, Alaska-Pacific Steamship Company, Pacific-Alaska Navigation Company, Union Oil Company, Standard Oil Company, Atlantic and Pacific Steamship Company, W. R. Grace and Company, Luckenbach Steamship Company, San Francisco and Portland Steamship Company, San Francisco Pilot Association, Southern Pacific Company, Matson Navigation Company, Puget Sound Navigation Company and others.

With the advent of the new year an interesting and important event in the American management of two of the oldest transatlantic lines has taken place—Mr. Charles P. Sumner, the general agent of the Cunard Line in New York for the past five years, taking over the management also of the Anchor Line upon the retirement of Mr. William Coverly from the latter.

Mr. Sumner's active experience in connection with maritime affairs of over forty years will stand him in good stead in assuming the additional duties and responsibilities. As a native of Boston, he was early connected with the Warren Line, was the founder and owner of the Sumner Line between New York and Liverpool—the first line of importance exclusively devoted to the carriage of freight and live cattle between these ports.

As one of the most active and influential members of the New York Produce Exchange, Mr. Sumner served for many years as chairman of the complaint committee, and his resignation of that important post in January, 1904, on his removal to Boston to become the agent there of the Cunard Line, was much regretted. To his indefatigable efforts as chairman of the joint committee of members of the New York, Boston and Philadelphia Exchanges was largely attributed the success of the fight for the removal of the Board of Trade restrictions of W. N. A. load line for British steamers loaded in American ports north of the Chesapeake.

His management of the Boston agency of the Cunard Line was most successful, and led to his appointment to the general agency here upon the resignation of the late Mr. Vernon H. Brown.

Mr. Sumner's administration of the two lines will be watched with interest but no doubt as to the successful result exists in the minds of his friends. His thorough study and intimate knowledge of the technical and physical working of ships, the best utilization of space for cargoes, etc., have resulted in the adoption of the most modern methods and means, making of the Cunard piers models whose operations are watched and followed by the trade.

Though beset with difficulties during the past troublous months because a majority of their vessels have been requisitioned by the British Government, thus severely curtailing facilities to Liverpool, the Cunard Line have

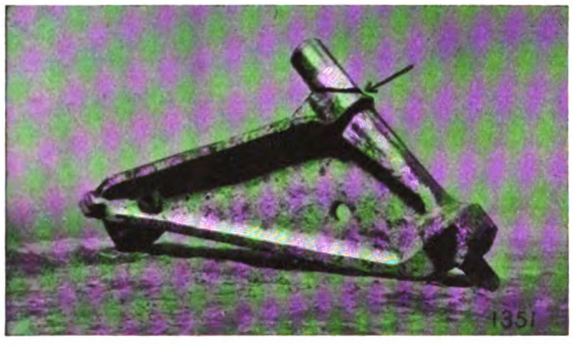
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maintained a regular service with their popular "Lusitania," "Franconia," the new "Orduna" and "Transylvania" and by the charter of a number of fine freight vessels, and Mr. Sumner is most sanguine not only of upholding the old-time prestige of the Cunard Line, but of achieving similar success with the Anchor Line.

White Brothers, the leading hardwood dealers of the Pacific Coast, have been finding the opening of the Panama Canal of great benefit in securing large shipments of valuable timber. On December 14 the steamer "Peter H. Crowell" of the Sudden and Christenson Line brought in a large shipment of plain and quarter-sawed oak. This oak comes from northern Mississippi and from the mills there was transported to Mobile in a special lumber train. At Mobile the lumber was taken by the "Crowell" and brought through the Canal. Early in January the "Montoso," also of the Sudden and Christenson Line, brought 93,000 feet of mahogany and a large quantity of genezero veneer and lignum vitae. About the same time the steamer "Pleiades," of the Luckenbach Steamship Company, brought in a large shipment of red gum and quartered oak from New Orleans for White Brothers.

INTERESTING WELDING JOBS.

The accompanying illustrations show an interesting welding job carried out by the San Francisco branch



Fractured steam shovel arm before welding.

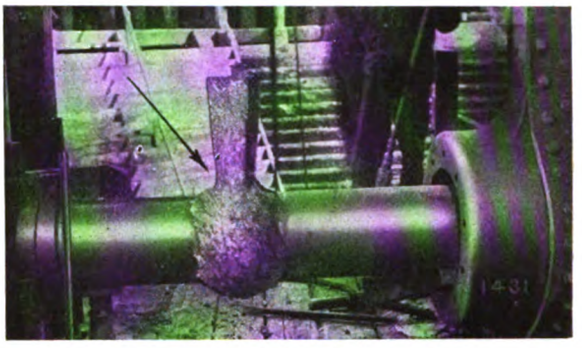
of the Goldschmidt Thermit Company. The steam shovel arm shown in the illustrations was 5½ inches in diameter at the point of break and the parts were held



Finished weld on steam shovel arm.

in line by inserting a pin into the center of each. This pin also held the two pieces the requisite distance apart to allow for a free flow of thermit steel between them. In making this weld 125 pounds of "Railroad Thermit" was required and the repair was completed in two days.

The Chicago office of the Goldschmidt Thermit Company recently handled the two interesting weld jobs pictured herewith. The steamer "Theodore Roosevelt" developed a vertical crack through the center of her



Eleven inch tail shaft weld for SS. "Yale" of the Great Lakes Engineering Company.

stern frame where the post joined the shoe. This crack was drilled out to provide an opening for the Thermit steel and the weld was made in the usual way; 250 pounds of Thermit was used and the actual work commenced at about eleven a. m., the weld was poured on the same day at 9 p. m. and the mold was stripped next morning at 10 a. m. The fourth picture herewith il-



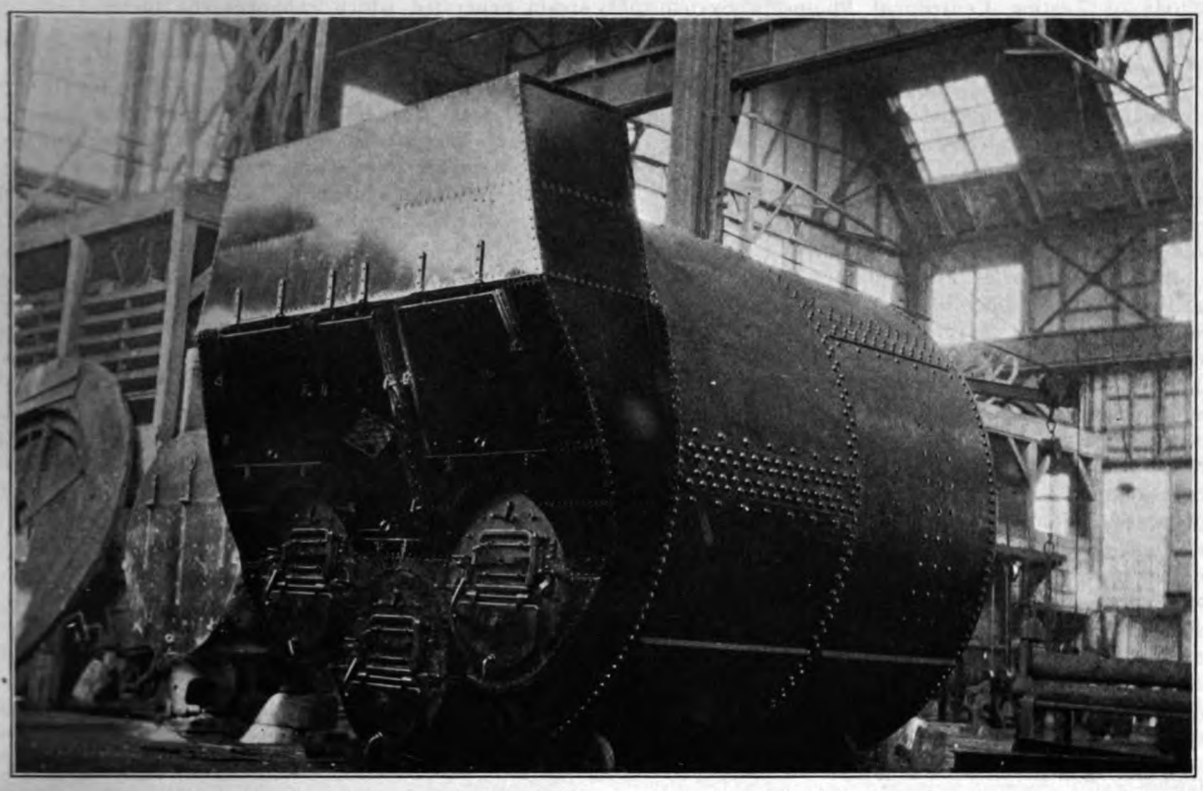
Thermit weld on the stern frame of the "Theodore Roosevelt."

lustrates the welding of a tail shaft eleven inches in diameter for the S.S. "Yale" of the Great Lakes Engineering Company.

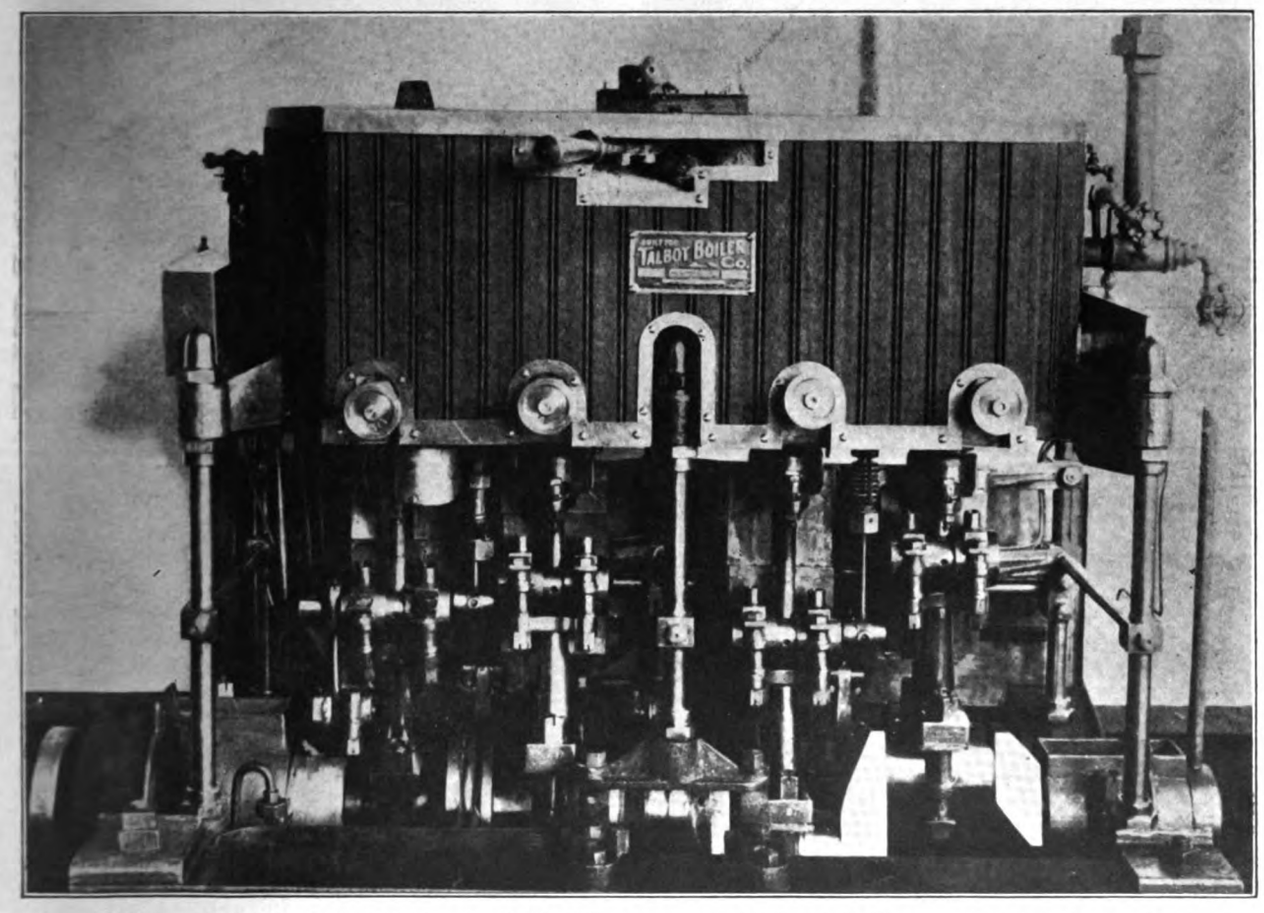
NEW PUBLICATION.

What is probably the most complete commercial publication devoted solely to centrifugal pumps is being distributed by the De Laval Steam Turbine Co., of Trenton, N. J. This book of 298 pages, contains over 300 illustrations, including centrifugal pumps for all capacities and heads, and for motor and steam turbine drives, diagrams showing the "characteristics" of such pumps and explaining the relations between impeller blade angles and characteristics, interior views and views of parts showing the constructon, views showing the method of manufacture by the use of limit gages and methods of testing, installations of pumps for various services, also numerous illustrations of the De Laval reducing gear employed to allow electric motors, water turbines, steam engines and steam turbines to operate at the most economical speed when driving a centrifugal pump. The text matter is divided into chapters under such headings as "The Introduction of the Centrifugal Pump and the Work for Which It Is Adapted"; "Features to be Considered in Selecting Centrifugal Pumping Equipment"; "The Use of the Characteristic Curve";

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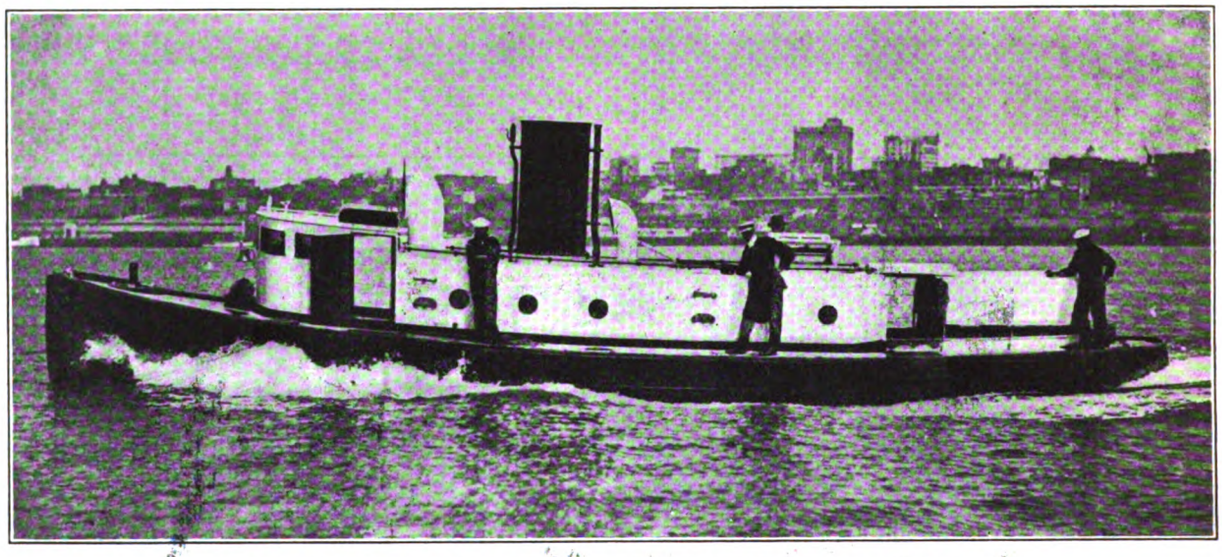
A 13' 3" by 11' 6" boiler with the forced draft breeching in place. This picture was taken in one of the shops of the Manitowoc Boiler Works Company's plant, where a good many boilers for Pacific Coast service have been manufactured.



The four cylinder steam unit of the Talbot Boiler Company. These engines are attracting a great deal of interest on account of their low cost of operation.

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"Methods of Testing Centrifugal Pumps"; "System of Manufacture for the Production of Interchangeable Parts"; "Details of Design and Construction of Single-stage and Multi-stage Pumps"; "The Speed Question, Particularly Relating to Steam Turbine Driven Centrifugal Pumps"; "Helical Speed Reducing Gears"; "Motor and Belt Drives"; "High Duty Steam Turbine Driven Pumps as Compared with Reciprocating Pumping Engines for Water Works Service"; "The Adaptation of Pumps for Circulating Condenser Water, Feeding Boilers and other Steam Power Plant Service"; "Drainage and Irrigation Pumps"; "Hydraulic Pressure and Elevator Pumps"; "Pumps for Marine Uses, Mining Service, Fire Service and Hot Water and Brine Circulation," etc. Tables and charts are given for determining the resistance of pipes and the relation between heads and spouting velocities. The investigation of the pumping problem, together with drawing up of specifications for centrifugal pumps, are also treated at some length. The chapters on "Pump Characteristics" will prove more valuable to the pump user than many of the more technical treatises. The chapter on "Water Works Pumps," showing that under many conditions the centrifugal pump can handle water at a cost of 20 to 40 per cent. lower than it can be handled by reciprocating pumps, because of the lower fixed charges, will be a revelation to many who have not recently given this matter consideration.



A Government launch equipped with Talbot boiler and steam engine.

THE TALBOT MARINE BOILER.

An oil fired water tube boiler of small size and low weight per horse power and of high thermal efficiency has been placed upon the market by the Talbot Boiler Company of New York. The complete weight of a 100 h. p. boiler including accessories is 5000 pounds, or 50 pounds per horse power. The floor space occupied is 3′ 6″ by 5′ 0″ and the height 6′ 6″. Automatic controlling devices regulate the supply of feed-water to the boiler and oil to the burners, making the boiler immediately responsive to the demand for more steam.

The water enters the upper part of the boiler and the steam is discharged from below, where the heating surface is in contact with the highest temperatures. Two advantages are gained from the counter flow of the water and the gases of combustion; first, the uptake gases are at a much lower temperature than that of the steam generated which enhances the thermal efficiency, and, second, the rapid circulation prevents the formation of scale.

The boiler consists of a number of specially cored, crucible steel headers arranged horizontally one above the other, into each of which are screwed several groups of single ended tubes, also arranged horizontally. Inside the tubes are smaller circulating tubes leading into separate cored chambers in the header.

The peculiar coring of the headers causes the water which enters at one end of the header to pass through the group of inner or circulating tubes leading from the first core or chamber and return through the outer tubes to the next core or chamber, which in turn connects the outer tubes of the first group with inner tubes of the next group of circulating tubes and so on, as the water passes successively through the groups of tubes in each header, beginning at the top and finally issuing at the bottom as steam. In order to prevent the water from gravitating at once to the lower part of the boiler, each header is connected to the next header below it by a trap.

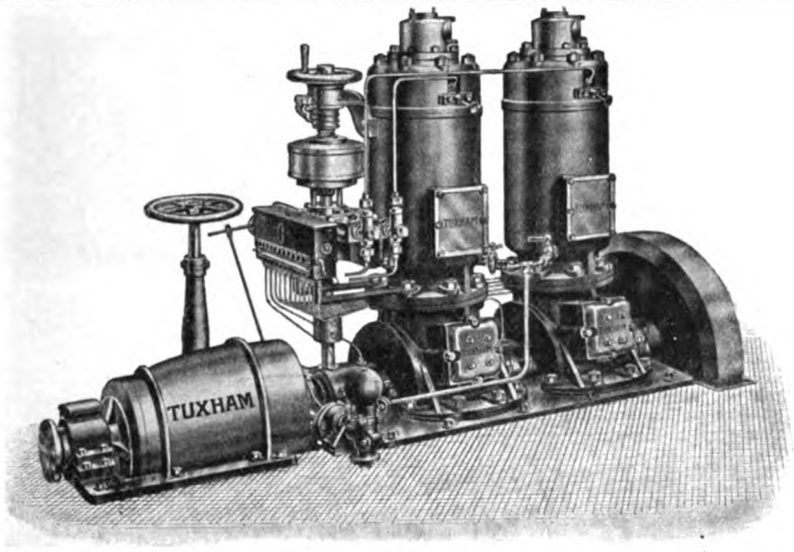
Two somewhat similar headers are arranged obliquely at the sides of the furnace, while at the back of the furnace is a crucible steel wall so cored that the steam from the top of one of the side headers is carried through this wall to the bottom of the other side header, which is the last header in the series of circulation. This coring is so proportioned that a high velocity is maintained throughout during the operation of the boiler.

The tubes and headers are supported on a framework consisting of four vertical stanchions. A jacket is secured to the outside of the stanchions or framework and the space between the tubes and these panels is insulated with asbestos-magnesia. At the opposite end of the boiler from the header end are tube-supporting plates and a door frame which protects the tube sheets from the intense heat of the furnace. The tube sheets are secured to the framework in the same manner as the headers.

Feed Regulator.

On the door frame at the front of the boiler, through which the feed water first circulates, is an automatic feed regulating device of the piston type operated by compound levers connected to one of the nearby tubes in the last group of the circulating series. The position of

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Tuxham engine, stationary type. A similar engine is now being demonstrated at 209 Main Street, San Francisco.

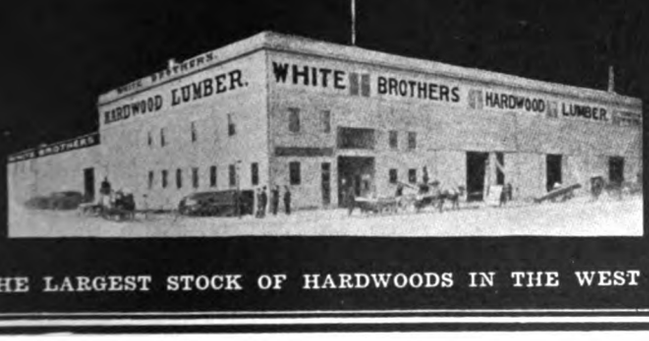
this regulating tube is such that it is subject to the greatest heat not only of the furnace, but from the steam within the tube. As the tube becomes hotter and expands, the valve connected to it is actuated by the connecting levers, so that it admits water to the boiler, which in turn cools and contracts it, reducing the supply of water to the boiler. It is claimed that when steam enters, this valve adjusts itself automatically and remains with a certain opening under ordinary working conditions. After the feed has passed through the door frame and through this valve, it is delivered to the upper header at the top of the boiler through a hand regulated valve designed to adjust the superheat within certain limits and to steady the action of the automatic regulating device.

An automatic safety device operated by the regulating tube is also provided which cuts off the oil to the burner when the heating surface of the boiler becomes overheated.

TUXHAM ON EXHIBITION.

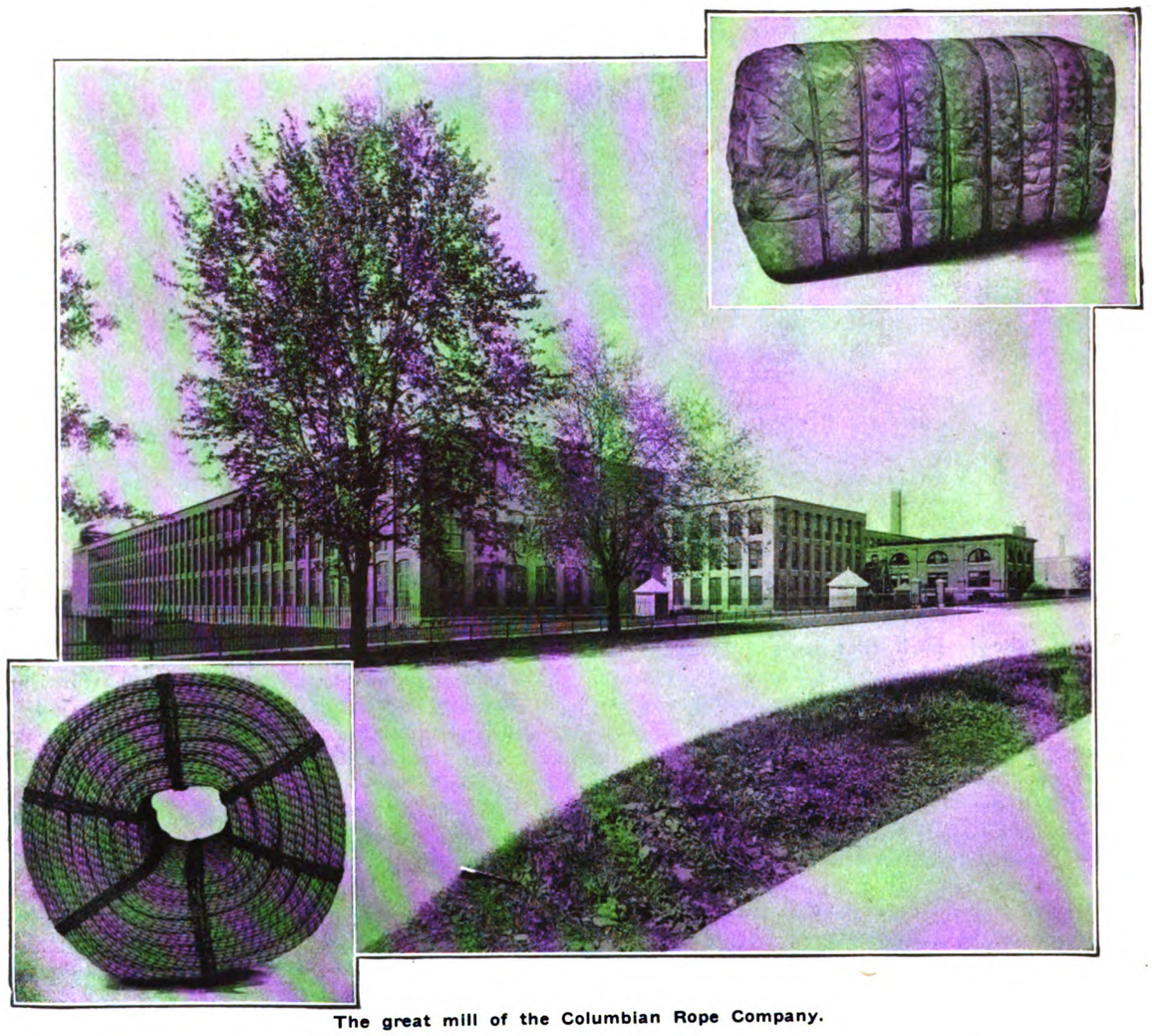
A great deal of interest is being manifested in the latest semi-Diesel engine to be shown in San Francisco. Messrs. Petersen & Schmiegelow, agents for the Tuxham engine, now have a stationary unit under operation at 209 Main street, San Francisco. This machine was shipped out from Copenhagen on the motorship "Malakka," which also, by the way, was furnished with an auxiliary electric lighting set operated by a Tuxham engine. The engine now being used for demonstrations is a two cylinder, vertical, stationary type and is rated at 28 shaft horsepower. At the present writing no attempts have been made to check up the fuel consumption on this engine with any degree of accuracy, but from rough observations the consumption of Union Diesel Engine Oil is considerably less than one-tenth of a gallon per shaft horsepower hour. Accurate fuel tests will be taken on this engine within a week or two and authentic data in this regard will be published in the next issue of the Pacific Marine Review. Anyone interested in the progress of internal combustion engines should call at 209 Main street any afternoon and see the Tuxham engine in operation.

The American Steam Gauge and Valve Manufacturing Company of Boston, Massachusetts, is distributing an attractive little booklet on steam boilers and boiler feed water. Anyone who is interested in the problems arising from impurities which exist in even the purest water known commercially, will find it well worth their while to write to Boston for this interesting and instructive little treatise on the subject.



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The great mill of the Columbian Rope Company.

The cut herewith illustrates the mill of the Columbian Rope Company at Auburn, New York. In the upper corner is shown a bale of pure manila fibre, the raw material which comes to the mill, and in the lower corner a finished manila hawser. Columbian rope has always held an enviable place in the regard of the trade. This is due in a large measure to their very careful selection of manila fibre and also to the careful and painstaking factory methods employed. In this connection it is worthy to note that not a single piece of manila rope from the Columbian Rope Company's mills failed to fulfill the federal government tests. This is a splendid testimonial and speaks volumes for the sustained quality of product and the rigid system of rope inspection in force at the mill.

Rouse's patent sea anchors were recently installed on the "Bear," "Beaver" and "Rose City" of the San Francisco and Portland Steamship Company. Since the passage of the ruling by the U. S. Inspection Service requiring the installation of an efficient sea anchor for every lifeboat, the simple, efficient and reliable device of Captain Rouse has been in great demand.

When bids for the construction of six new torpedo boats were opened at Washington on November 10th, it was found that Mare Island Navy Yard was almost 25 per cent. below the private builders.

It is the intention of the War Department to sell the old army transports "Crook" and "Meade" as soon as the necessary permission to do so is granted by Congress. The "Crook" is laid up at Fort Mason and the "Meade" is lying at Newport News. Both vessels are practically useless as transports.

C. H. Evans and Company Machine Works, among other recent installations, put two Evans Steam Steering Gears in the Southern Pacific Company's steamers "Alameda" and "Contra Costa." These steering engines are 4" by 6" in size. A similar steering gear was placed on the steamer "Sacramento" of the Farmers' Transportation Company. The engines of this stern-wheeler were also constructed and installed by this firm. Numerous orders for pumps were also filled during 1914. The wideness of the firm's field is indicated by the fact that pumps were sent to Seattle, Guatemala, Alaska and Hawaii.

SEALED PROPOSALS will be received at the Office of the Bureau of Lighthouses, Department of Commerce, Washington, D. C., until 2 o'clock p. m., February 24, 1915, and then opened, for furnishing, for a fixed sum, the materials and labor of all kinds necessary for the construction, equipment, completion, and delivery of two single-screw, steel, oil engine propelled Light Vessels, Nos. 101 and 102, for use on the Atlantic Coast, to an authorized representative of the Bureau of Lighthouses, at the builder's wharf. Blank proposals and particulars may be obtained by addressing the Commissioner of Lighthouses, Washington, D. C.

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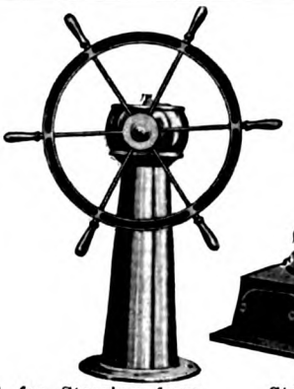
Single Wheel Steam Steering Gear



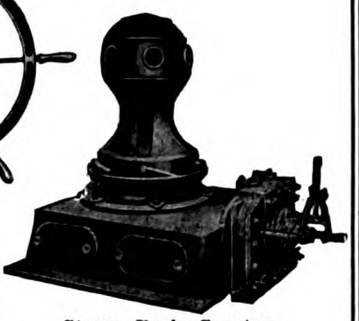
Spud Hoist for raising and lowering spuds on dredges



Gang Plank Hoist



Standard for Steering from top of Pilot House

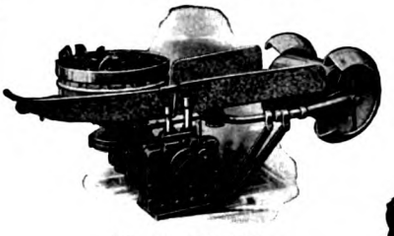


Steam Deck Capstan

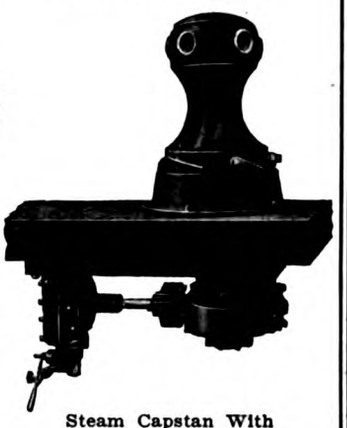




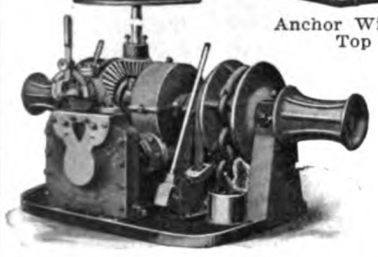
Anchor Windlass without Top Capstan



Steam Net Lifter



Steam Capstan With Engine under deck



Anchor Windlass with Top Capstan

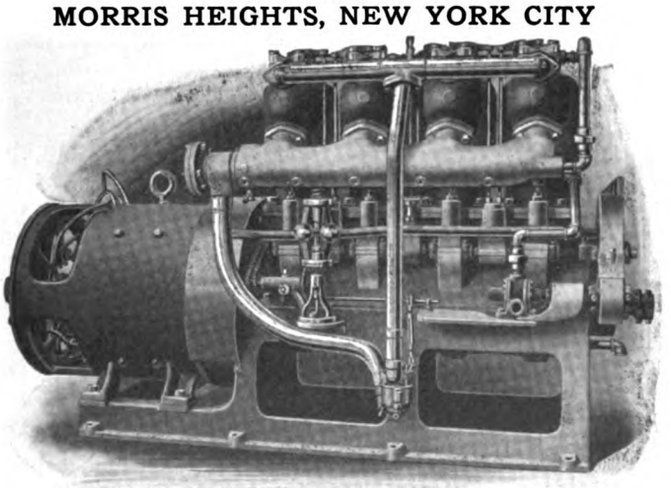
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FREIGHT REPORT.

San Francisco, January 21st, 1915.

Our last review was dated December 15th, 1914, and the freight market, up to date, has been very active and constantly rising. On the 16th of December the market opened strong at 45/- for barley, which was an advance of 2/6 from the last steamer chartered on the 12th, Balfour, Guthrie & Co. having taken the "Picton" at 45/-, and the steamer "Sverre," a day or so later, was chartered by Strauss & Co. at 45/- for U. K. with option of four ports in Scandinavia at 55/-. The same firm also chartered the "Mancunia" at 45/- in the beginning of January, Balfour, Guthrie & Co. put the "Clarissa Radcliffe" on the berth from Puget Sound and San Francisco at 47/6, and G. W. McNear chartered the sailer "General de Negerier" at 37/6, followed by the "Springbank," a few days ago, at 40/- for U. K. with the option of 7/6 additional to Scandinavian ports.

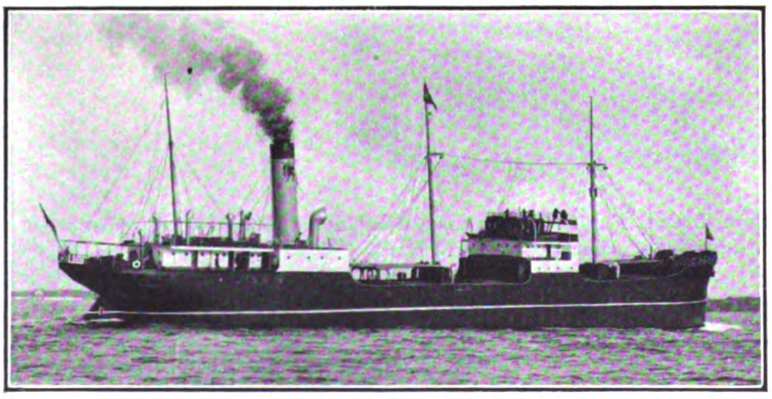
From the North Pacific, rates closed on the 15th of December at 42/6 and opened on the 17th by the charters of the "Hermiston" and the "Swindon" at 43/9. A few days later, Strauss & Co. paid 45/- for the "Muncaster Castle," and this month the "Mancunia" and the "Strathgarry" were chartered at 45/-, and to-day the steamer "Strathspey" is reported chartered for grain from the North at 50/- by Kerr, Gifford & Co., which price is bid for more tonnage, quite a remarkable rise, caused mainly by the enrmous demand for steamers from the Atlantic Coast to U. K. M. H. Houser chartered the sailers "Celticburn" and "Dudhope" at 37/6 for U. K. and the "Wiscombepark" at 40/-, the latter with option of 35/- to Africa or Australia. The steamer "Washington" was chartered by the Belgian Relief Committee at 50/- for Rotterdam.

Lumber freights to Australia and to the West Coast still remain lifeless owing to the lack of demand, but both these countries are now beginning to come into the market, and two or three of our schooners have been fixed at 43/9 to 45/- direct port West Coast, and 45/- to 47/6 per thousand to Sydney, and one schooner, the "Rosamond," was fixed to-day at 60/- for Adelaide. For Africa, Hind, Rolph & Co. chartered the schooner "Mahukona" and bark "Prompt" at 80/- per thousand with option of two ports at 82/6, and Heatley & Co. of London chartered the "H. K. Hall" at 77/6 to one port, and 80/- to two ports.

Lumber freights for U. K. have shown the greatest activity. Messrs. A. F. Thane & Co. chartered the steamer "African Transport" with ties from Humboldt Bay to U. K. at 87/6, and the sailer "Lawhill" from Portland at 75/-, also the "Heinemoa" at 82/6. The "Biagio O" was taken by the American Trading Co. at 75/, and Comyn, Mackall & Co. started the year by paying 95/- for one port in U. K. and 100/- for two ports for a steamer to be named later, besides chartering the steamer "Edgar H. Vance" on time for delivery on this side to U. K., and re-delivery at San Francisco, at about $275 per day. On the first of this month, the American Trading Co. chartered the "Inversnaid" at 95/- for one port U. K., and G. F. Neame & Co. paid 95/- for a steamer, and yesterday the climax was reached when Heatley & Co. paid 100/- per thousand for the sailer "Lucipara" to load in the North Pacific for a direct port U. K.

Time charters have also advanced, the Maple Leaf Line having paid 8/- per ton on the dead weight, for the steamer "Wray Castle," delivery Japan, thence in ballast Puget Sound to load there and at San Francisco for re-delivery in England. For Australia, the steamer "Hornelen" was chartered for a trip to Australia, delivery San Francisco, re-delivery Sydney at 7/6, and the "Keishin Maru" to follow for the same voyage at 7/- on the dead weight, both to be loaded by the Union Steamship Co. The demand for cotton, which is not contraband, and which Germany has been buying in enormous quantities, has caused a rush all through the Eastern States and the Gulf of Mexico for tonnage to transport cotton to Bremen. The rates have gone by leaps and bounds from eight and nine dollars a bale up to fifteen dollars a bale, and all carried in American steamers; the supply of the latter being, as we all know, small, as Eastern shippers have come into our own market, and many of our steam-schooners have been chartered, by firms here, from $200 to $300 a day, Government-form, delivery and re-delivery San Francisco, and they in turn will load them from this Coast to the Gulf, and have rechartered them on private terms, supposedly good ones, to carry cotton from there to Bremen. Everything, therefore, at this writing is very strong in the freight market, and we certainly expect to see all records eclipsed very soon.

PAGE BROTHERS,
310 California St., San Francisco.



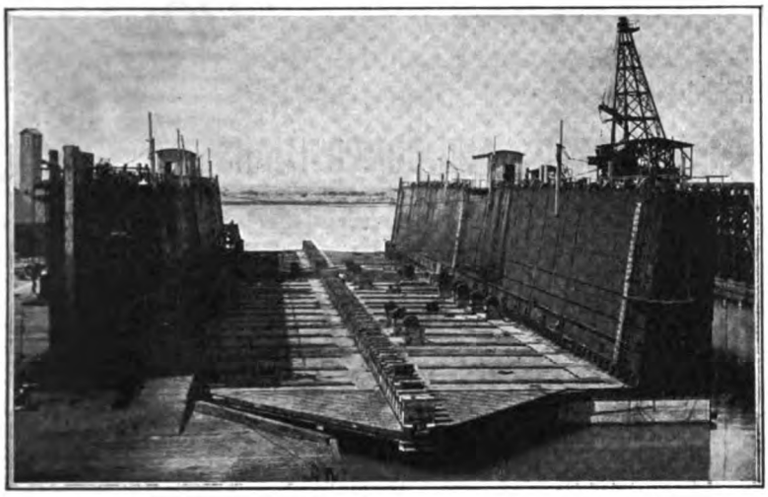
The SS. "Frieda" of the Union Sulphur Company, equipped with Eckliff circulators.

The Eckliff Circulator, as manufactured by the Eckliff Automatic Boiler Circulator Company, has been making remarkable strides in popularity during the past year. Pitting, grooving, furrowing, seam leaks, breaking stay bolts and scale formation,—these are the troubles which the Eckliff Circulator is designed to eradicate and the makers of this simple device have enough faith in their production to back it up with a guarantee of results that amounts to no cure, no pay. In addition to the steamers pictured herewith, there is a large and rapidly growing fleet of Eckliff users in the Navy, Army and Revenue Service, as well as in the merchant marine. Those interested in the securing of economy in the use of marine Scotch boilers would do well to submit their problem to the Eckliff Automatic Boiler Circulator Company for suggestions.

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INTER-ISLAND STEAM NAVIGATION COMPANY, L'td., Proprietors



FLOATING DRY DOCK "HOOLANA"

Length—

over keel blocks.....352' 0"
over wings .....301' 9"

Width—

over all .....100' 0"
between wings, top.... 84' 0"
between wings, bottom. 76' 0"

Draft—

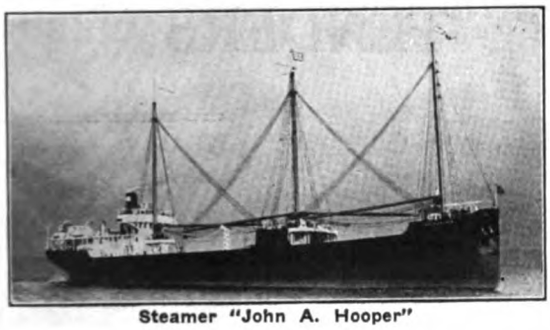
over Keel blocks..... 23' 6"

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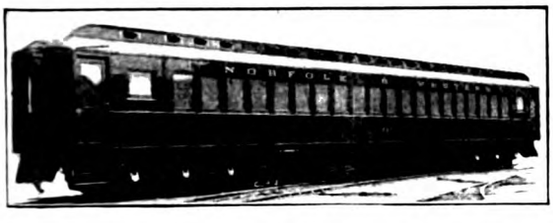
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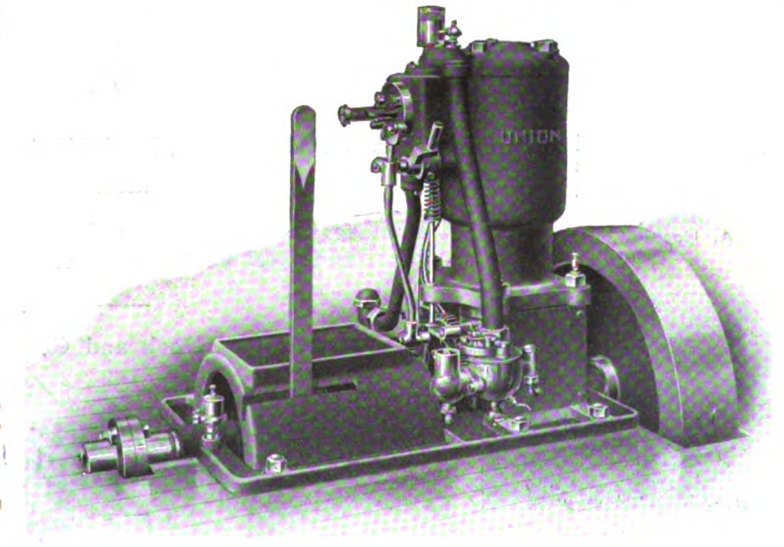
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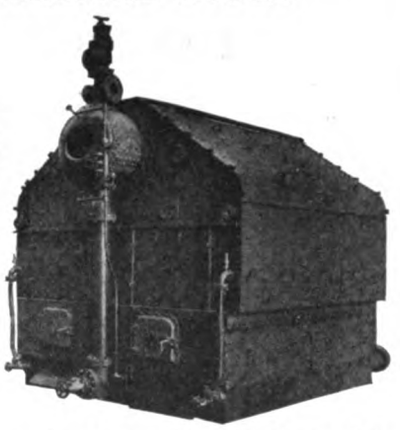
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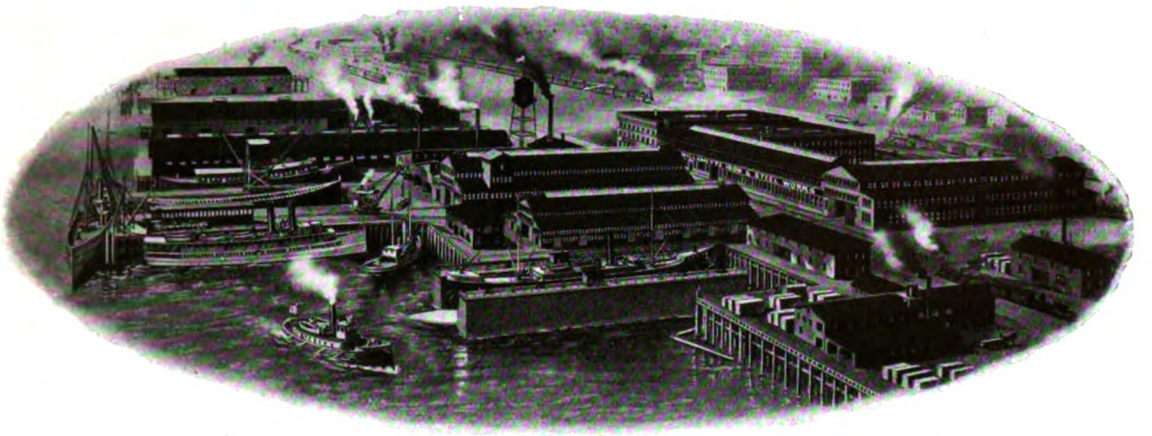
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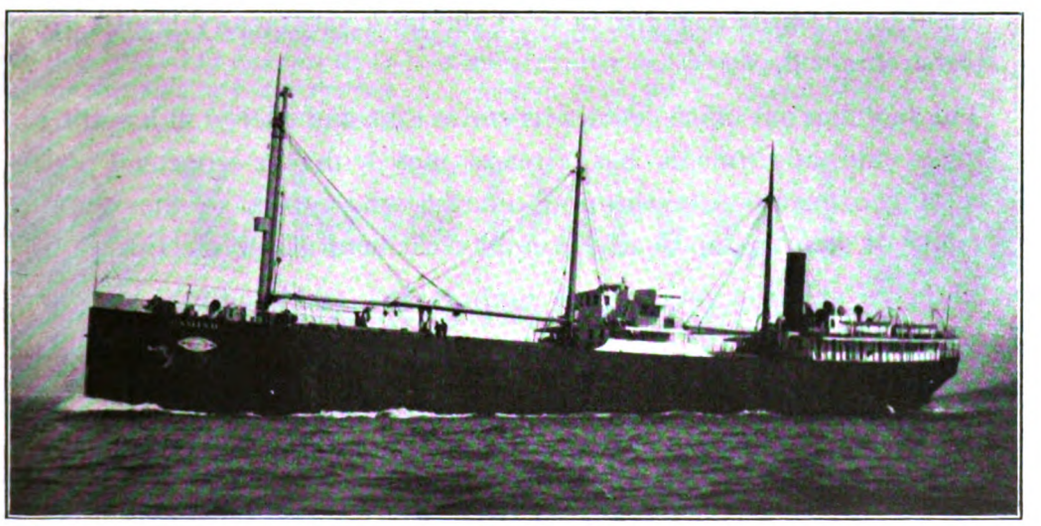
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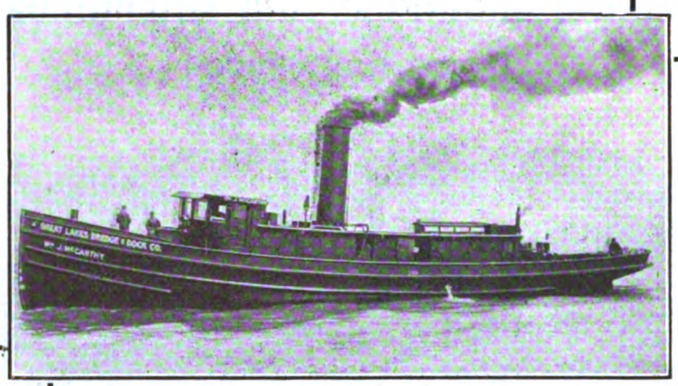
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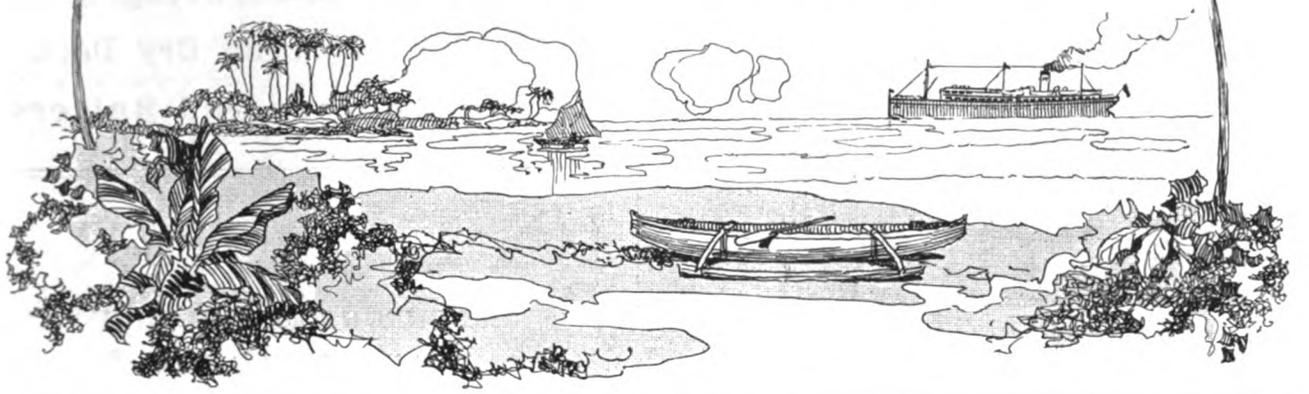
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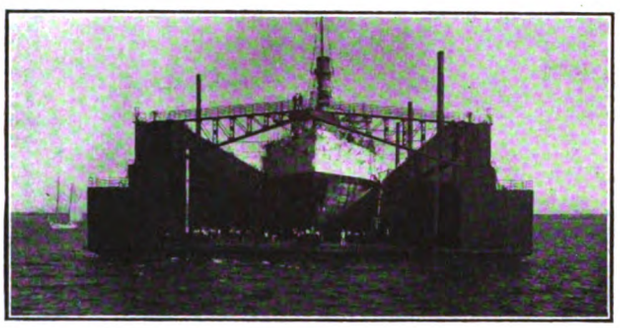
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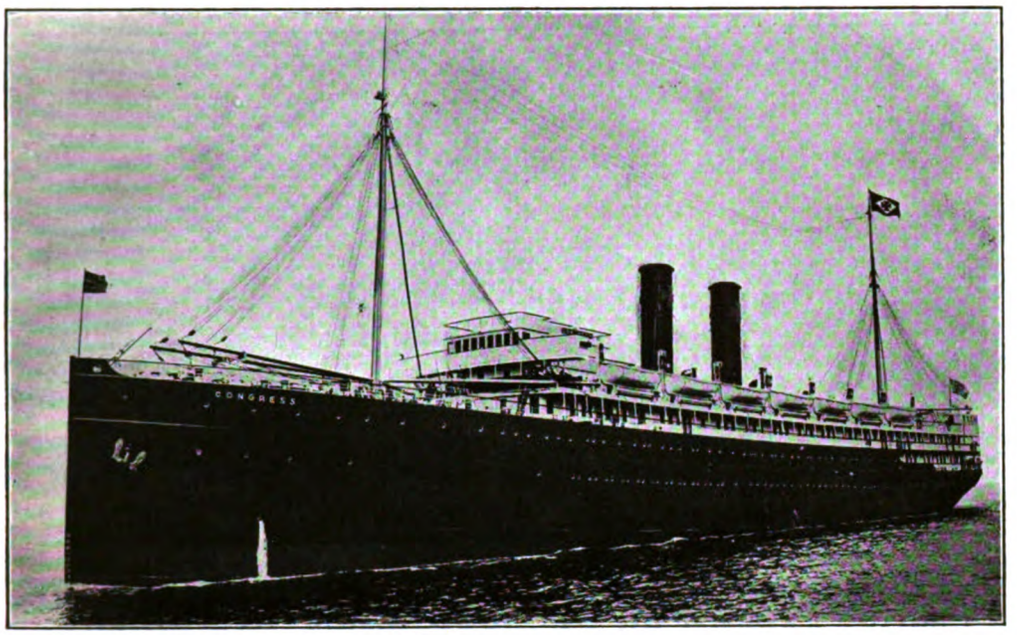
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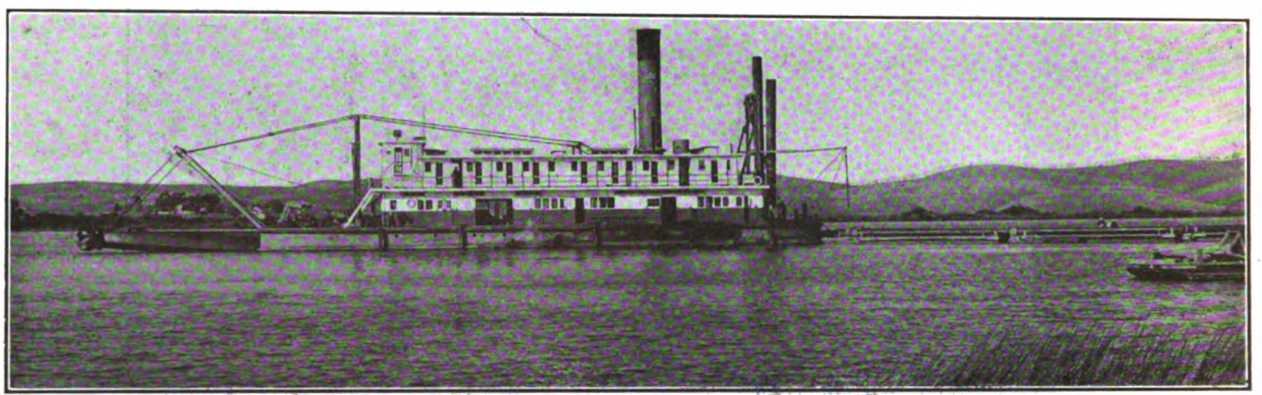
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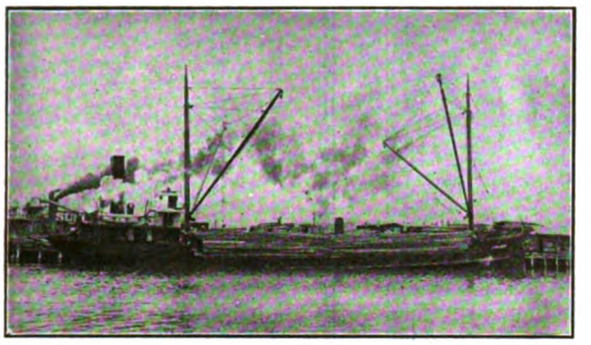
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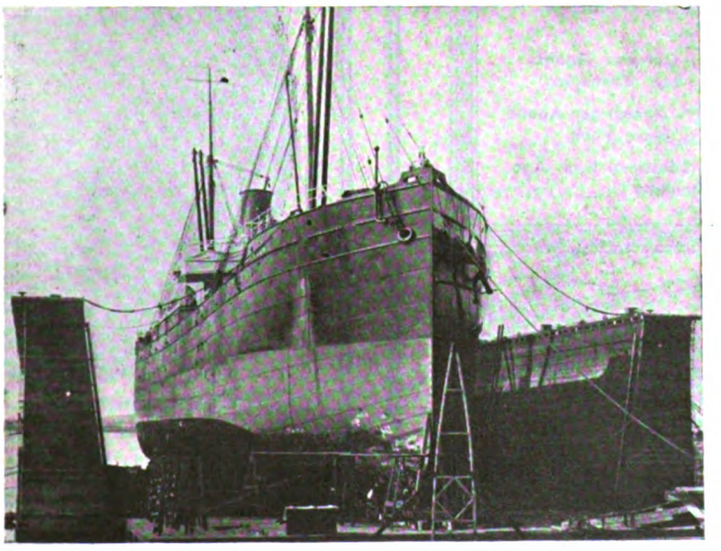
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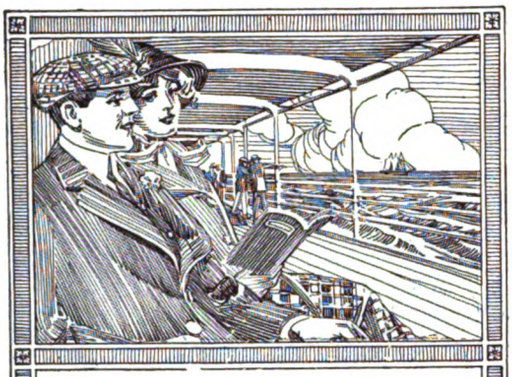
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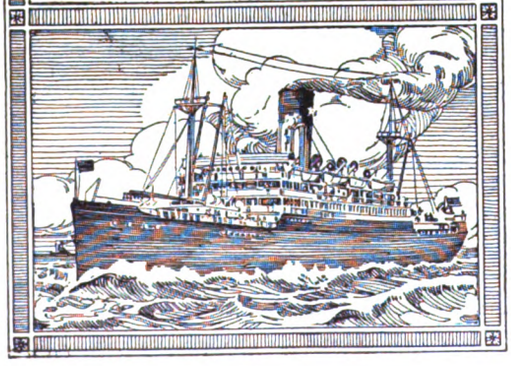
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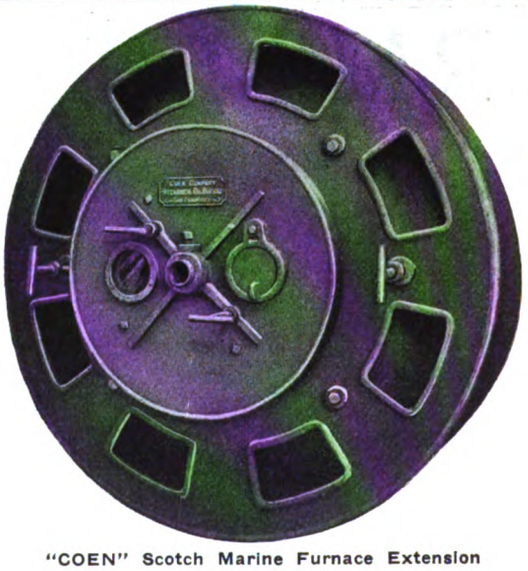
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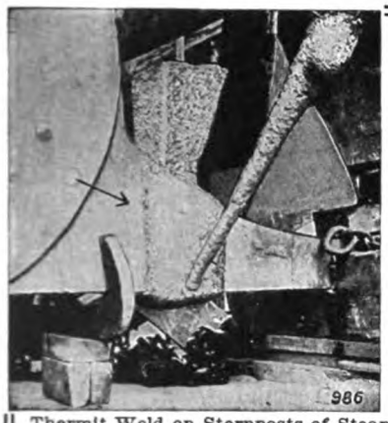
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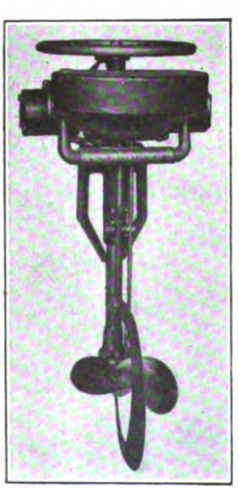
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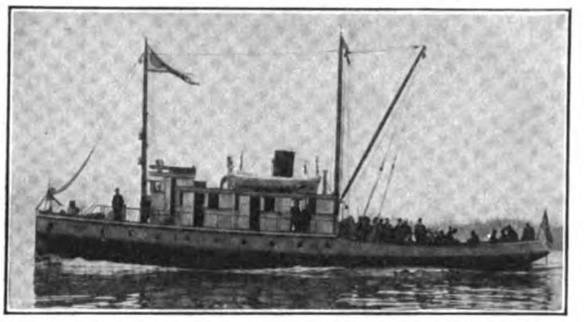
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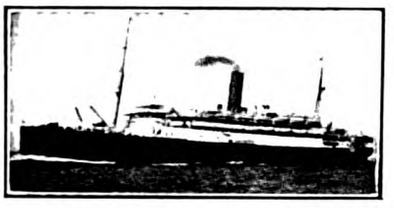
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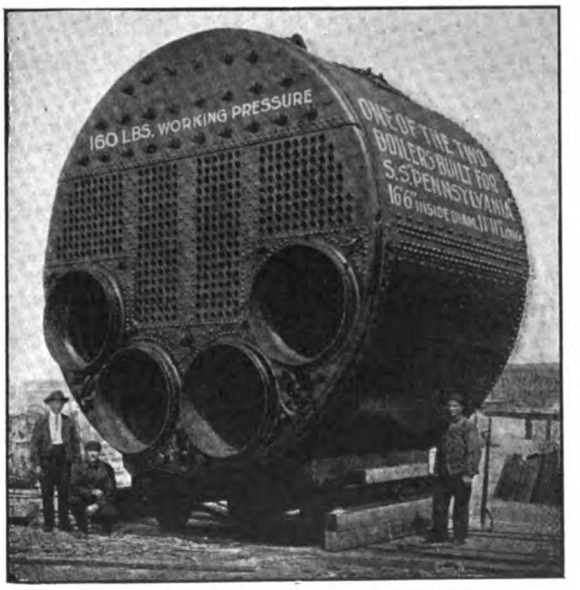
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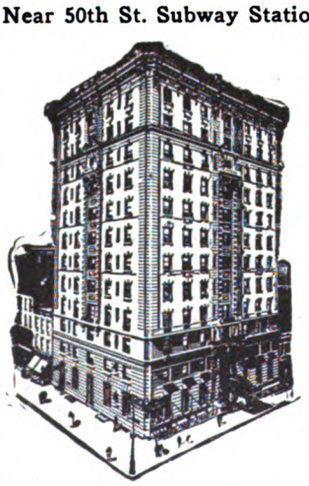
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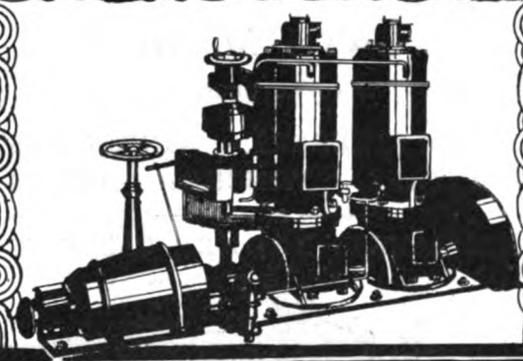
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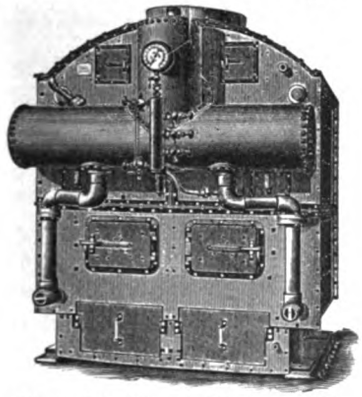
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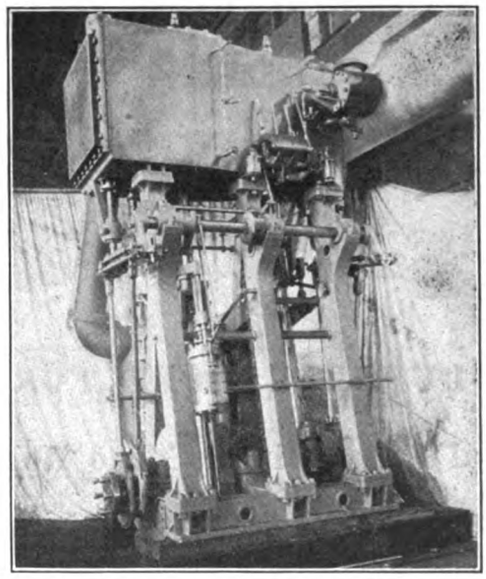
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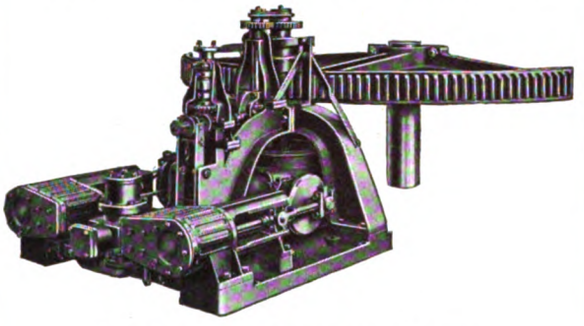
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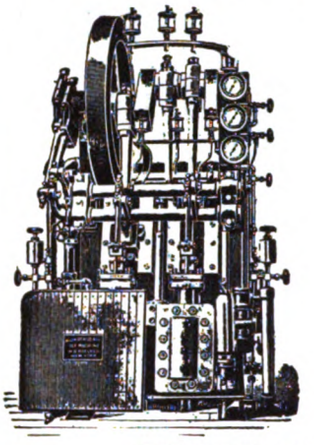
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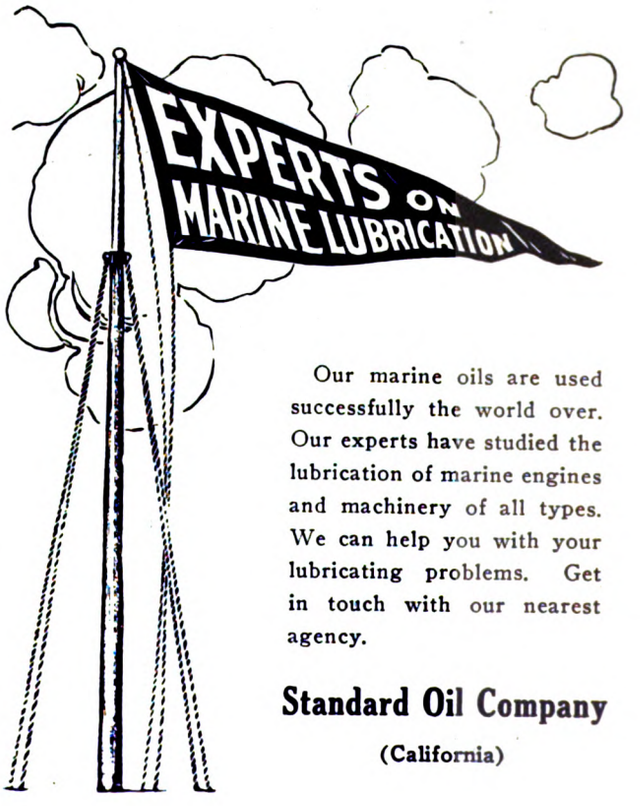
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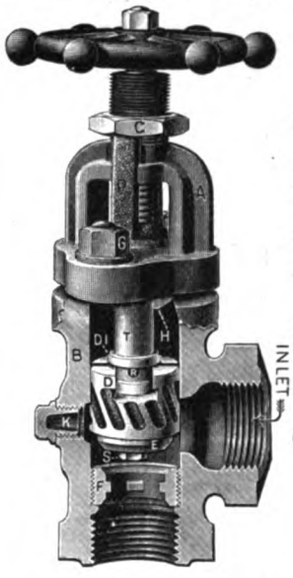
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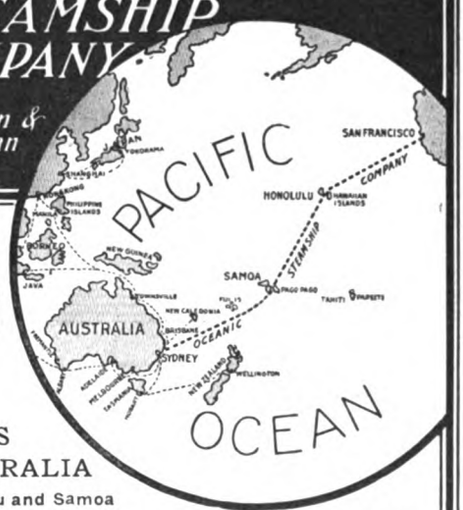
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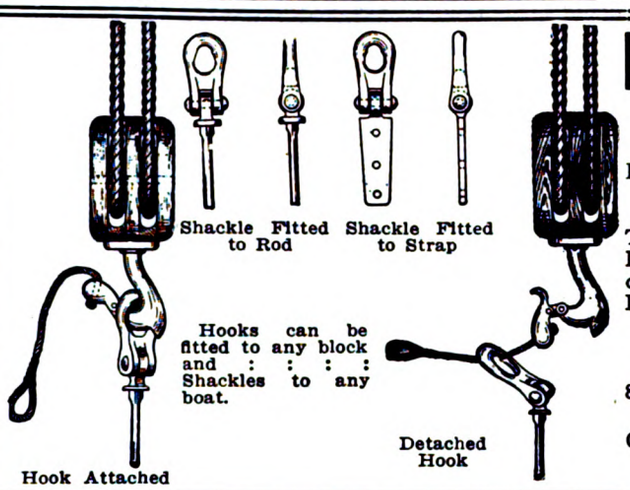
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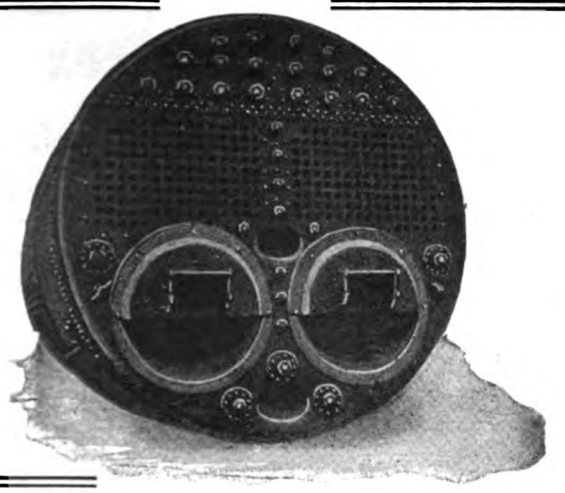
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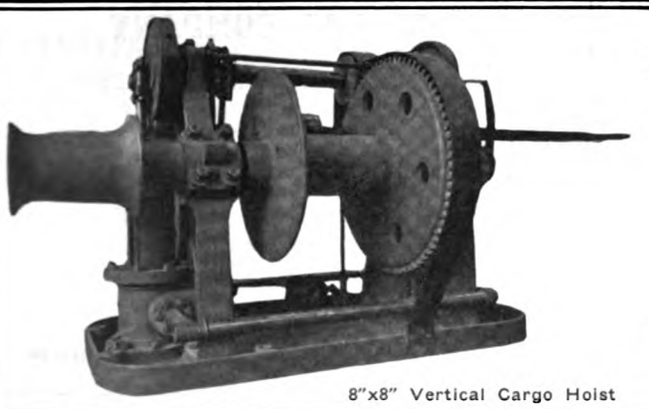


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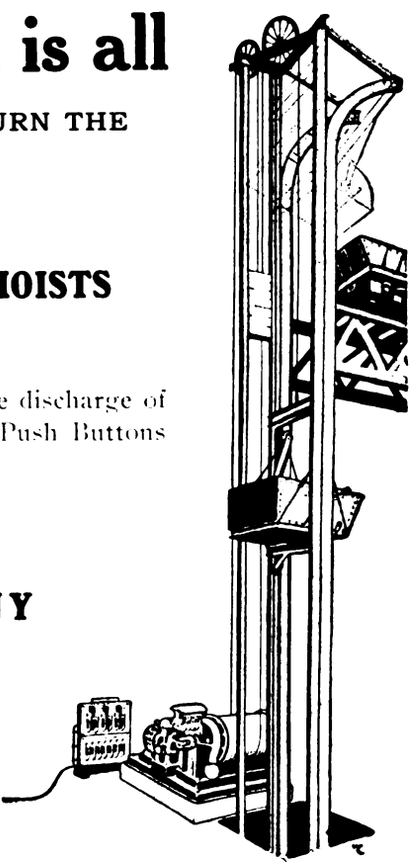


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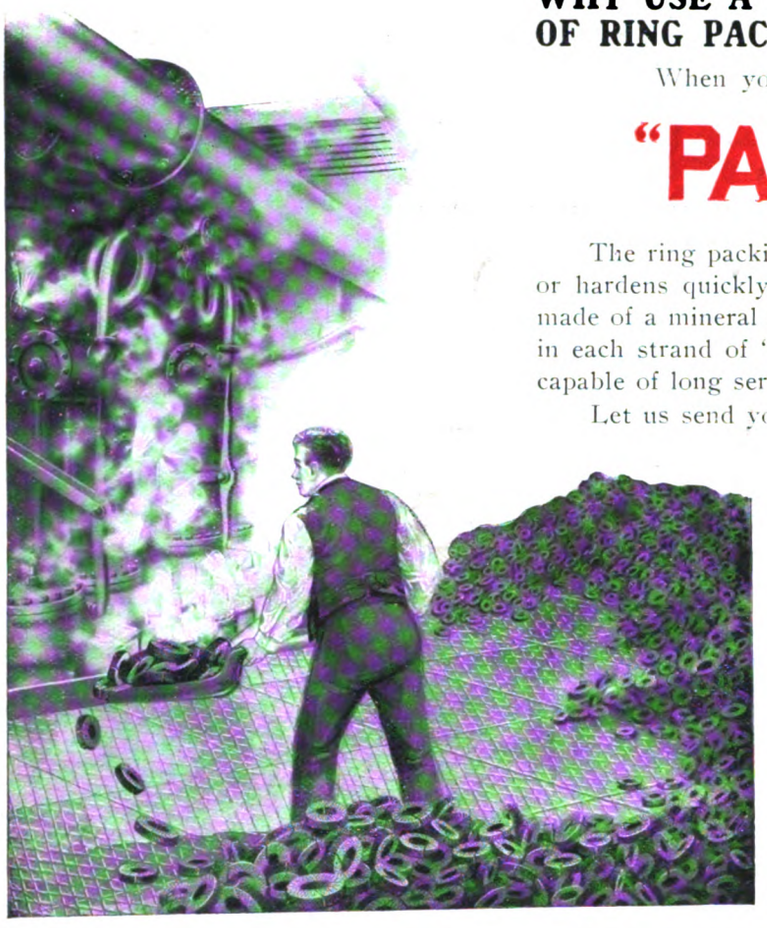
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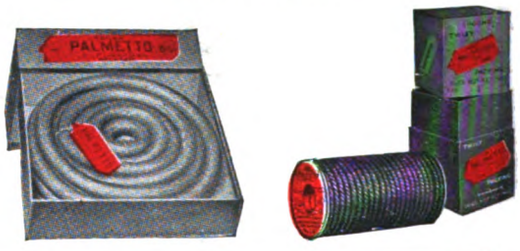
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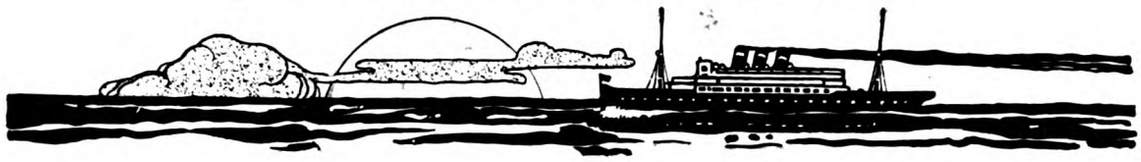






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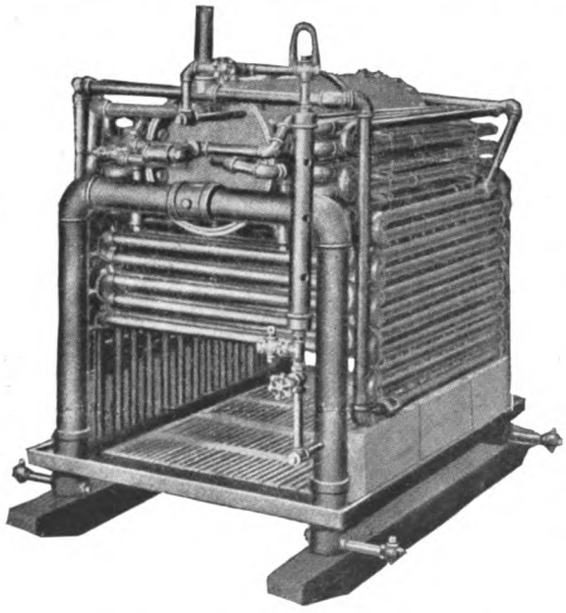
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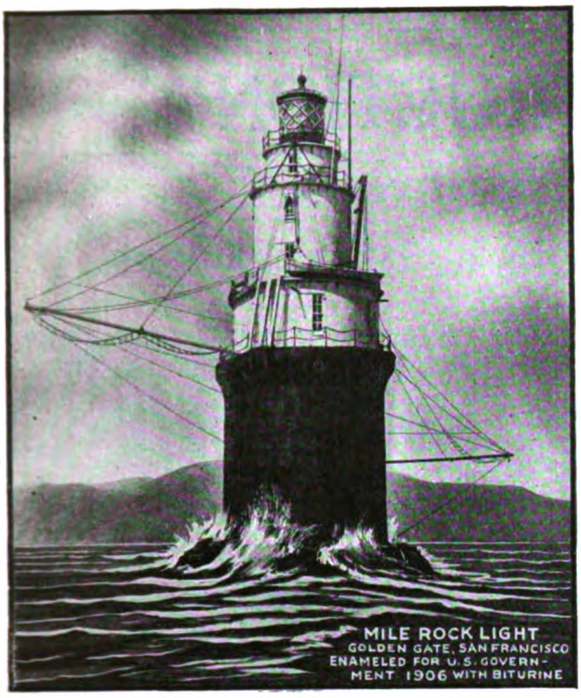
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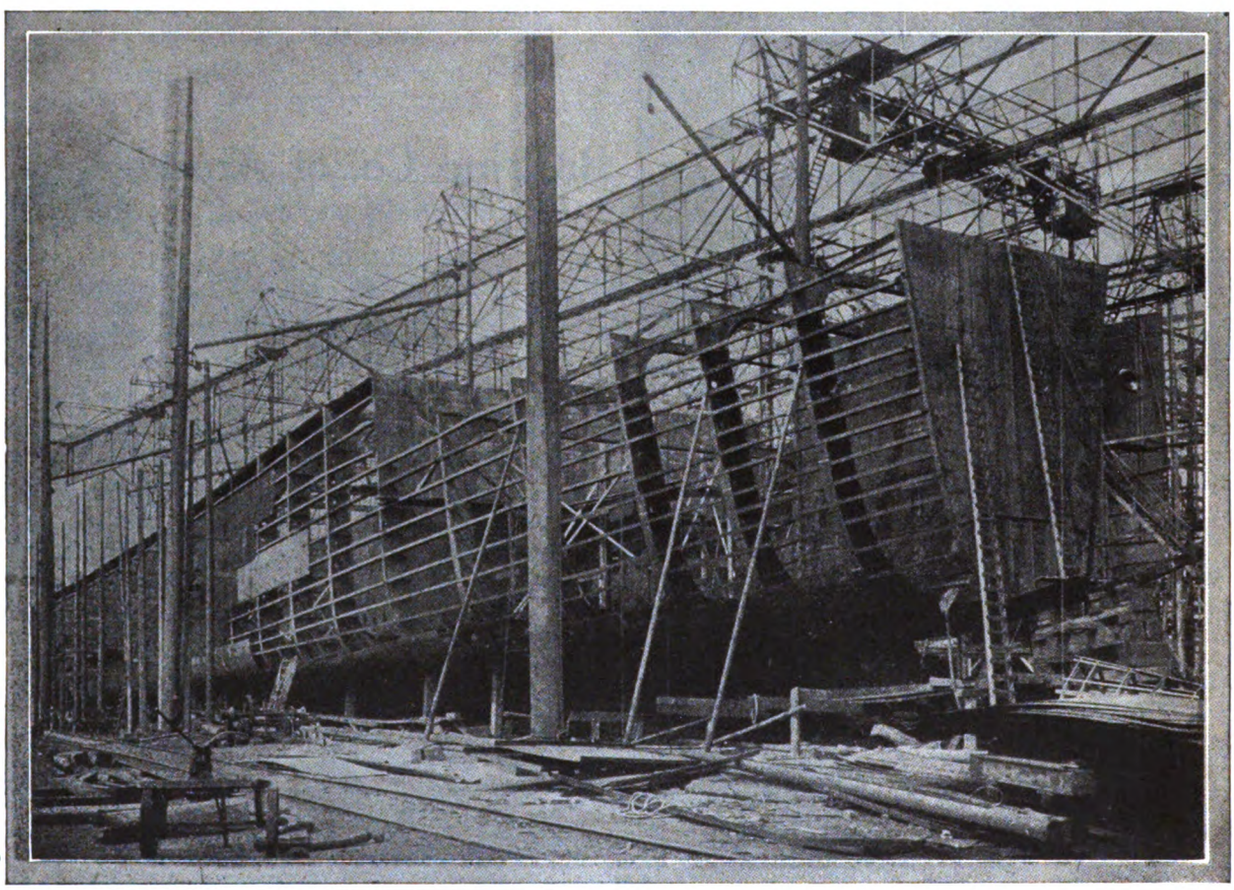
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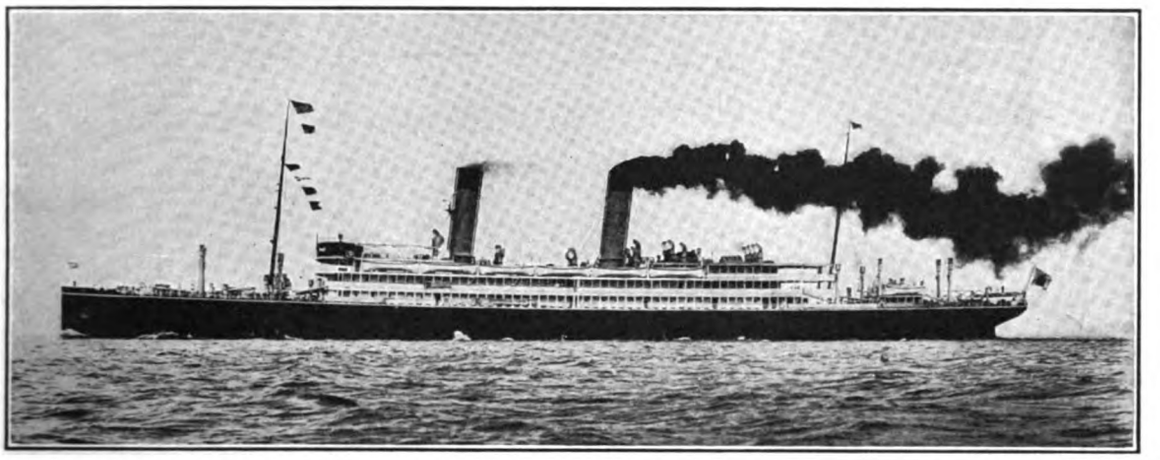
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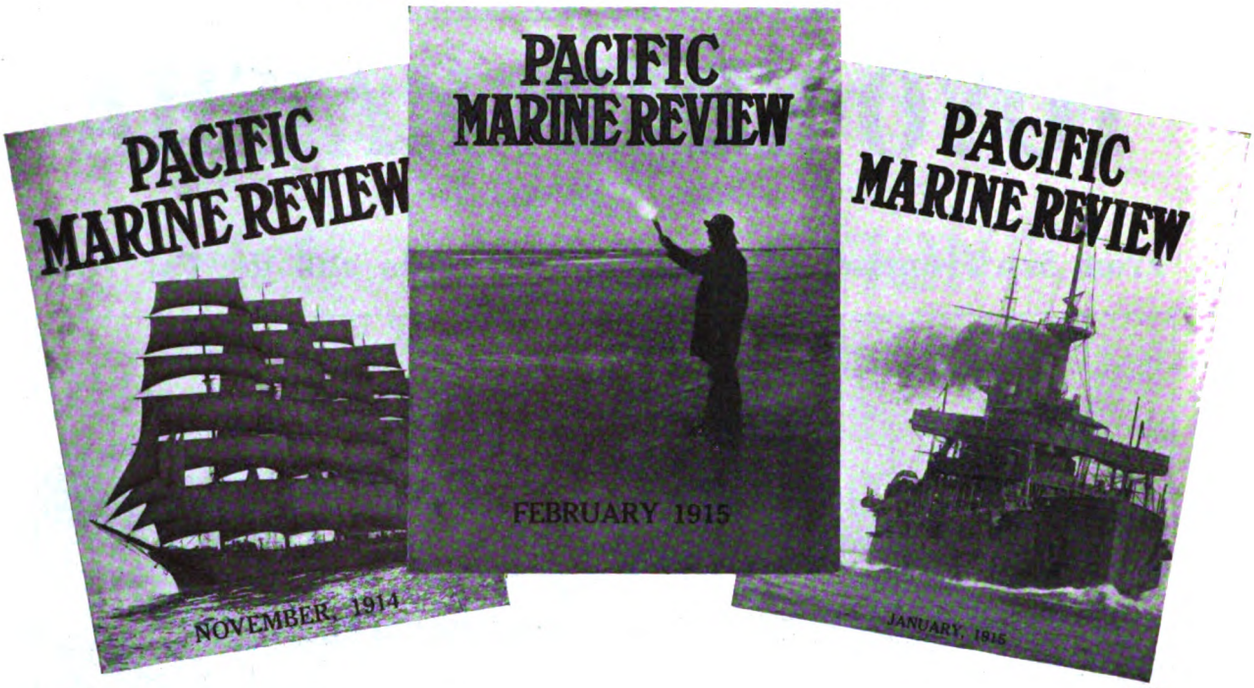
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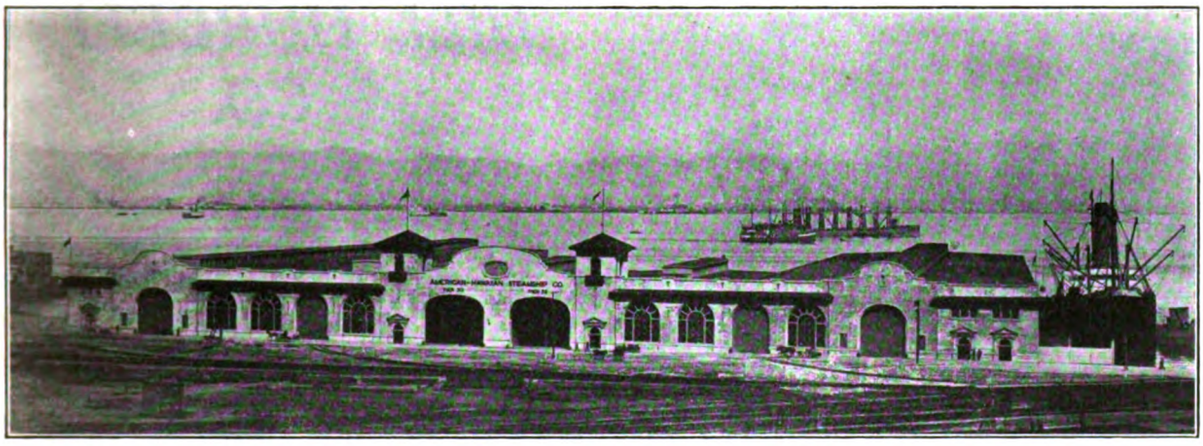
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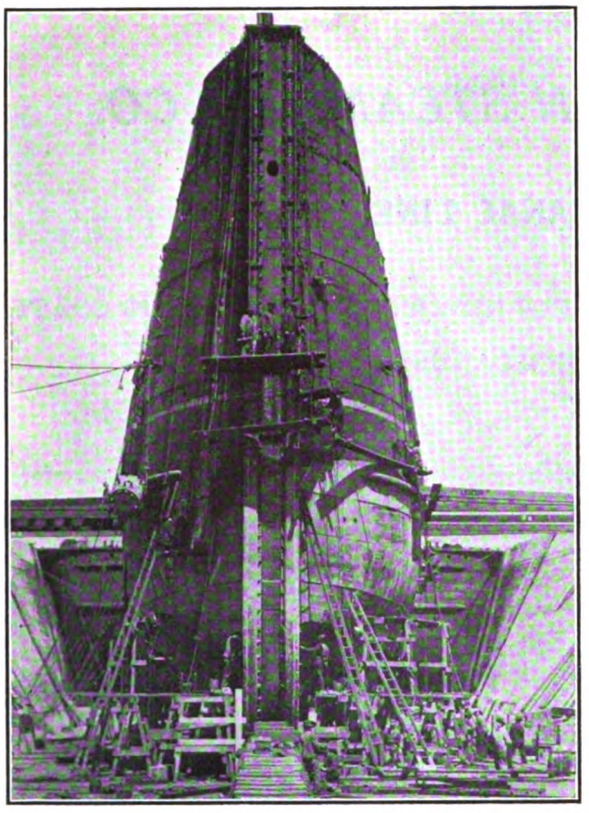
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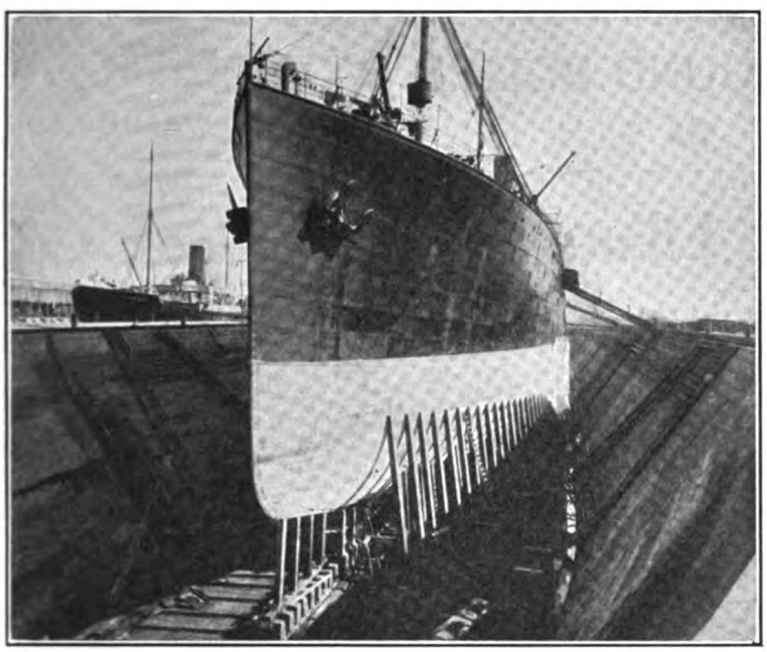
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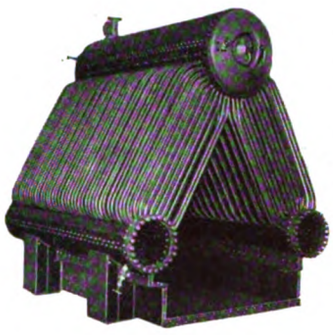
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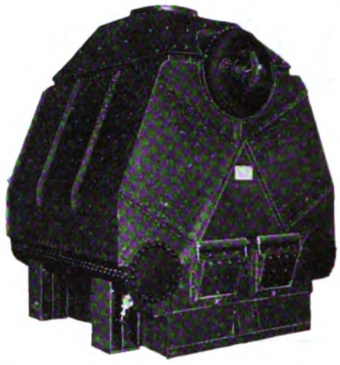
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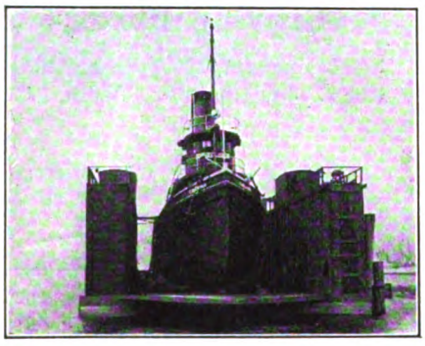
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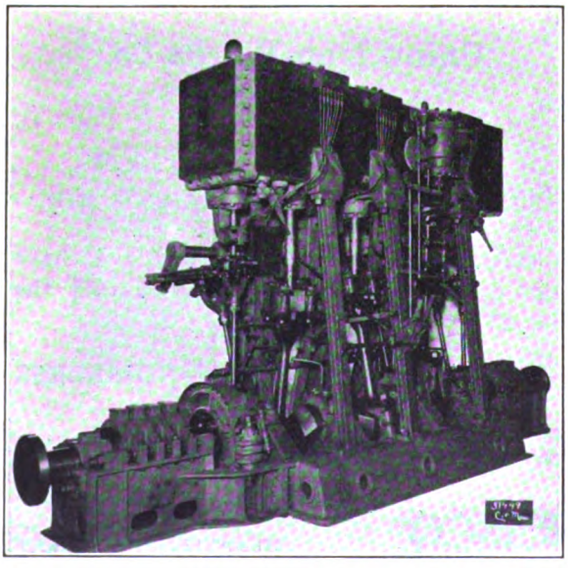
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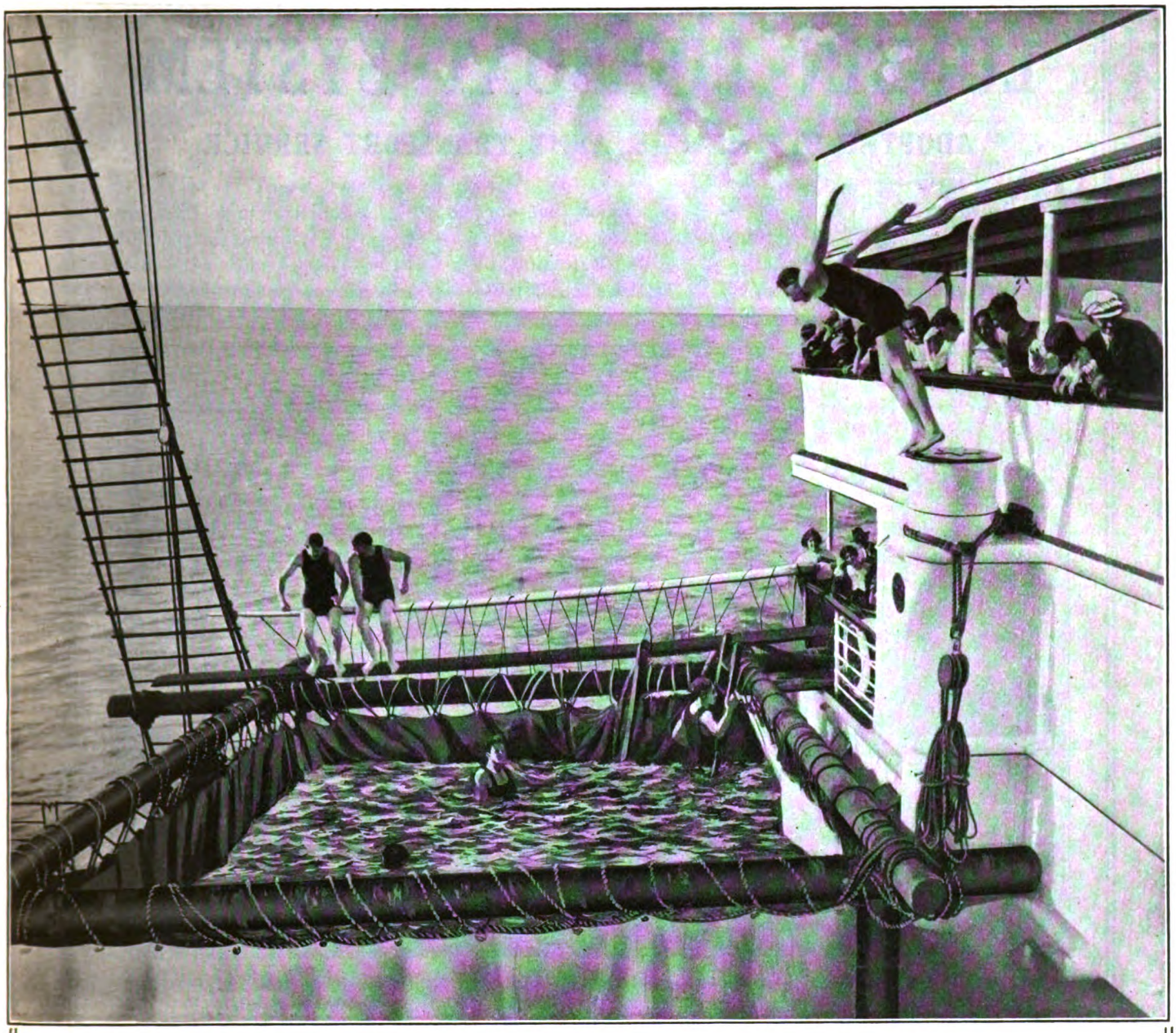
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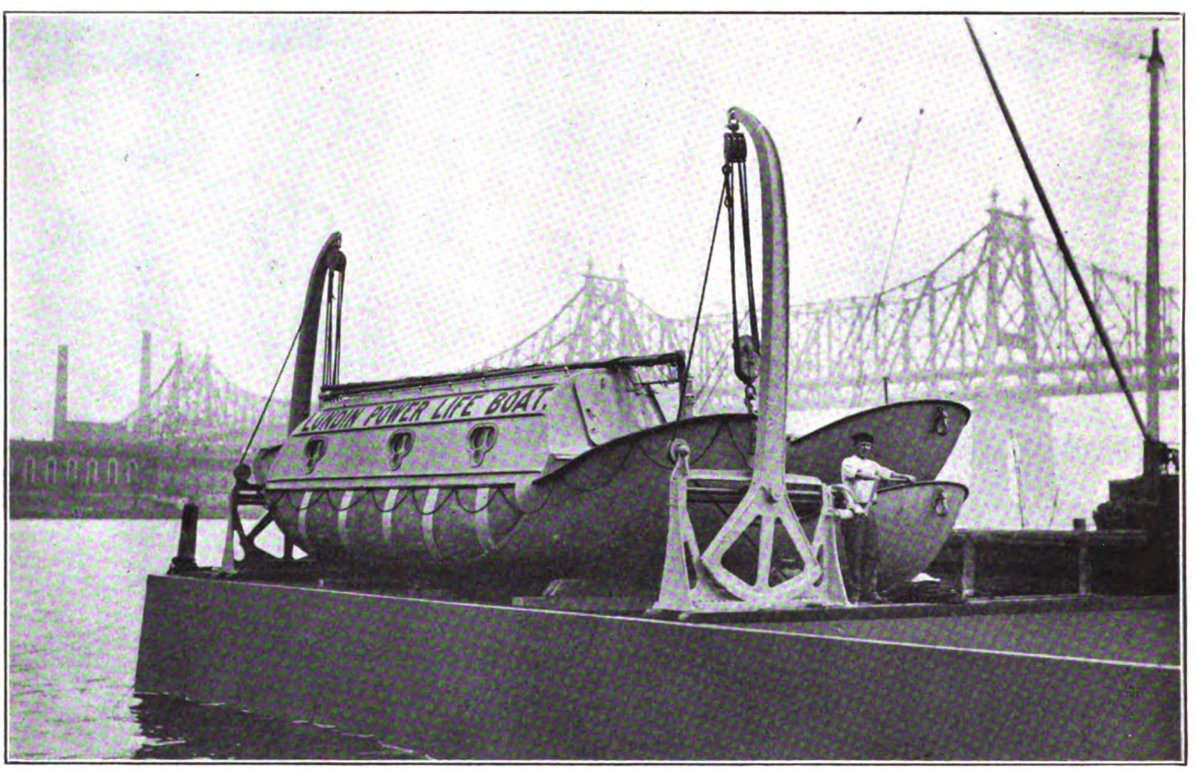
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PACIFIC MARINE REVIEW

OFFICIAL ORGAN OF THE SHIPOWNERS' ASSOCIATION OF THE PACIFIC COAST.

VOL. XII, No. 3. SAN FRANCISCO MARCH, 1915.

Why Not an American Board of Trade?

IN RECENT issues of the Pacific Marine Review we attempted to trace the rise and decline of American foreign trade shipping and ascribe some reasons for our early success and our later failure on the ocean. Broadly speaking our early success upon the ocean was due to a rigid ship protection policy coupled with the fact that the Yankee loved to whittle and the ships be whittled out of his native forests were the equal if not the peer of anything then known to the art of building wooden ships. The decline was occasioned by an absolute departure from the protection system as applied to foreign-trade shipping, an utter disregard on the part of our Government of the rights or requirements of American merchants engaged in foreign commerce and also, indirectly, to the fact that the builders of the famous American clipper ships did not take kindly to the change from timber to iron. It is true that England abandoned direct ship protection about the same time as the United States, but the mother country set up a system of indirect protection which soon made her mistress of the seas, a position which was never seriously threatened until Germany's rapid and remarkable growth as a sea power.

Uncertainty the Great Curse.

The average American shipowner of to-day, especially those few engaged in foreign trade, can complain of high wages; obsolete inspection rules which take no count of time and are not calculated in any way to minimize expense and trouble; discrimination in dock and harbor dues owing to excessive American tonnage measurement, a condition which leads to foreign ships being favored even in American ports; the number of men required over and above the number carried by his competitors; local taxation of shipping in some sections of the United States, a condition undreamed of in Europe; heavily subsidized foreign lines which act as pioneers for and encouragers of great fleets of tramp ships; and finally foreign banking and credit systems that possess elasticity and business producing potentialities. Great as are these obstacles, however, the American shipowner is confronted with even a greater handicap in the absolute uncertainty as to what will take place in the Senate and House of Representatives of his native country.

One administration induces private capital to engage in a steamship venture by the offer of a meagre mail contract. Ships are built to fulfill onerous Government requirements which are made a part of the contract, and the service is carried out for a year or two and then comes a change of administration. Government aid is withdrawn and the service begins to lose heavily and is abandoned. This means a heavy loss to an individual line of steamers, but what shall we say when such tactics are applied wholesale? A Panama Canal is built and, during its construction, capital is led to believe that ships engaged in the intercoastal trade of the United States will be allowed to pass free of tolls. With this splendid offer of Government encouragement before them, many Americans invested their money in shipping constructed specially for coast to coast service. At the eleventh hour, the Government applies the same tolls to these ships as to all others.

A still more recent example of Government vacillation in regard to the shipping situation is its treatment of the International Convention for Safety of Life at Sea. This convention was called at the suggestion of the United States, it was composed of as eminent and capable a body of men as well could have been assembled, its findings were thorough and searching and its recommendations even revolutionary in character. Provisions were made for fire walls in ship construction, the rules in regard to watertight subdivision of hulls were altered so as to produce the maximum of safety compatible with the

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commercial uefulness of any class of vessel, the questions of manning and boating were all dealt with rigidly but sanely. The findings of this convention were practically repudiated by the United States Government. Waiting until almost the last day when ratification was possible, the convention was "damned with faint praise." It was ratified with a provision and that provision merely meant that the convention was not satisfactory isasmuch as it excluded politics. Washington insisted that a broad opening should be left in the ratification of the convention in order that the findings of the experts might be still further enhanced by a multitude of political theories and pet administration side issues such as the remarkable Seamen's bill.

The situation would appear to be cloudy enough with all these natural and artificial combinations working against the interests of any one with the temerity to venture capital in the foreign trade of our country, but on top of it all the owner of American ships engaged in the foreign trade, who had always been somewhat of a pariah, has now become a rascal and a grafter. He is a member of a giant ship trust, he is gouging the shipper and the public at every turn. A shipowner takes a gambler's chance on getting a ship through the North Sea mine fields. Of necessity his freight rates are enormous. If his ship is to be sunk by a mine, then the United States would be righteously indignant at the owner of the mine and formal Government protests would follow. If on the other hand, the American shipowner makes a success of his daring venture, he immediately becomes a soulless shylock and members of the Cabinet work themselves into a frenzy over his extortion.

Trusts of the Imagination.

One peculiarity of political United States is its ability to cling to a belief after the reason for that belief is dead. According to the Congressional Record and also according to the speeches delivered by our great statesmen, and others who ought to know better, the country is still suffering because of the existence of a shipbuilding trust and a shipowning trust. Statements are hardly ever entirely false and in this case there can be no doubt that the country is suffering, but it is not suffering on account of the presence of either of the two aforementioned trusts. It would be, perhaps, more within the bounds of possibilities to say that the country was suffering for want of these trusts.

Not many years ago what might be termed the big moneyed interests of the United States, having formed combinations of practically every character and arranged nearly all classes of business, cast their eyes on the shipyards of the country. A trust was quickly formed. Never in the history of this or any other country has a trust enjoyed such a meteoric career. The organizers of the combination had a splendid idea. There was to be a combination of yards and each yard was to specialize on one class of construction. A lima bean trust, a pin trust, a needle trust or a peanut trust are possible in this country, and they may exist, we are not sure about this and we do not care. But a shipbuilding trust in the United States is now and always has been an impossibility. It was tried once and failed miserably,—failed even before the Government had a chance to prosecute it. All the large steel shipbuilding done in this country would not pay interest on the capital of one self-respecting moderate sized trust, as trusts go in America.

The ocean is theoretically free to the foreign-trade ship, it is practically free to the coastwise ship. The transatlantic trade is largely controlled by foreign combinations of shipping interests. These combinations carry on their manipulations and trade divisions practically unmolested by their home governments and no combination of American ships, hampered as they would be by strict supervision on the part of the American Government, could ever hope to wrest the mastery of the foreign carrying trade from them.

In the coastwise business, on the other hand, anyone who wishes to operate a ship in the interstate trade is of necessity on a par with his competitors. Anyone who contradicts this is merely casting aspersions on the various state and interstate commerce commissions that have come to play so important a part in the business life of this country.

The One Practical Remedy.

When a person is sick his friends all have a different cure to offer him. The unfortunate individual may tinker away with one infallible nostrum or another, but if he is really ill and wishes to get well he goes to a specialist who can diagnose his symptoms and locate and eradicate the trouble. Our foreign-trade shipping is really sick. Congress has sat upon it in solemn diagnosis and prescribed nostrum after nostrum until the shipowner has now got so used to being dosed that he can swallow legislation that would choke any other industry. It is now proposed to send him round to a governmental ownership clinic and behead him altogether.

The various remedies, all of them guaranteed by their sponsors as being infallible, that have been offered the nation as a cure for what might be termed our sea-sickness, range from subsidies to differential duties and then back again through revised navigation laws, Government loans, the use of naval vessels as freight and passenger carriers, the visionary remedy of the Seamen's bill and finally Government ownership of regular steamship lines. Congress has never been able to decide upon any one of these measures, or upon any logical combination of the lot, as a basis for remedial legislation. The failure of Congress year after year,

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Democrat and Republican alike, to reach a lasting agreement upon any measure productive of good results has disheartened the true friends of an American foreign trade merchant marine until many of them believe that there is no chance left of ever placing the American flag on the ocean in a degree commensurate with the wealth and resources of the country.

There is one remedy that has not yet been tried, however, and this remedy carries the most hopeful promise of curing the merchant marine. Why not try a shipping commission modeled after the British Board of Trade and supply it with all the adjuncts, powers and accessories to make of it as great a factor in the maritime world as that remarkable body of men across the Atlantic? For the past ninety-five years we have pitted American politics against British brains and the brains have beat us hands down at every turn of the game. Such a board as proposed, properly clothed with all the powers of the British Board would make the struggle one of brain against brain and while Great Britain has nearly a hundred years start of us we might be able to do a tall lot of catching up.

Boston's Stand

NO CITY in the United States is taking a keener interest in the remedies proposed for rehabilitating our ocean-going merchant marine than Boston. The Boston Chamber of Commerce has come out very strongly on all merchant marine questions and its stand on the Government-ownership plan is both firm and convincing.

As a substitute for the Government-ownership plan, the Chamber proposes a definite policy which would develop a privately-owned and operated merchant marine under the general supervision of a Government shipping board and with the financial encouragement of the Federal Government.

Six suggestions outline the features of this proposed policy:

First: The establishment in the Department of Commerce of a Shipping Board of five members, after the example of the British Board of Trade and similar organizations of other maritime governments; such Shipping Board to be composed of the Commissioner of Navigation, and one representative each of the shipowning interests, the shipbuilding interests, the shippers in water-borne trade, and an expert in marine insurance—this board to have general supervision of the American merchant marine.

Second: A prompt revision and modernizing of our navigation laws and regulations, so far as they unnecessarily increase the cost of operating American ships as against foreign vessels.

Third: An amendment of the Ocean Mail law of 1891, so that the compensation now paid to twenty-knot ships to Europe can be paid to ships of less speed, of the second class, suitable to establish regular mail, passenger, and fast freight services in naval reserve ships on the longer routes to South America, Australasia and the Orient.

Fourth: In place of an investment of $40,000,000 in Government ownership and operation, as proposed by the pending message, a federal fund of the same amount, to be administered by the Shipping Board for the purpose of guaranteeing mortgages examined and approved by the board, or for careful loans upon shipping built or purchased for overseas trade and fitted for auxiliary naval service.

The $40,000,000 devoted to ownership and operation of a Government-owned fleet would produce only a relatively small fleet; but a proper use of a Government fund in the manner indicated would provide a large one, of far greater value to the commerce of the nation.

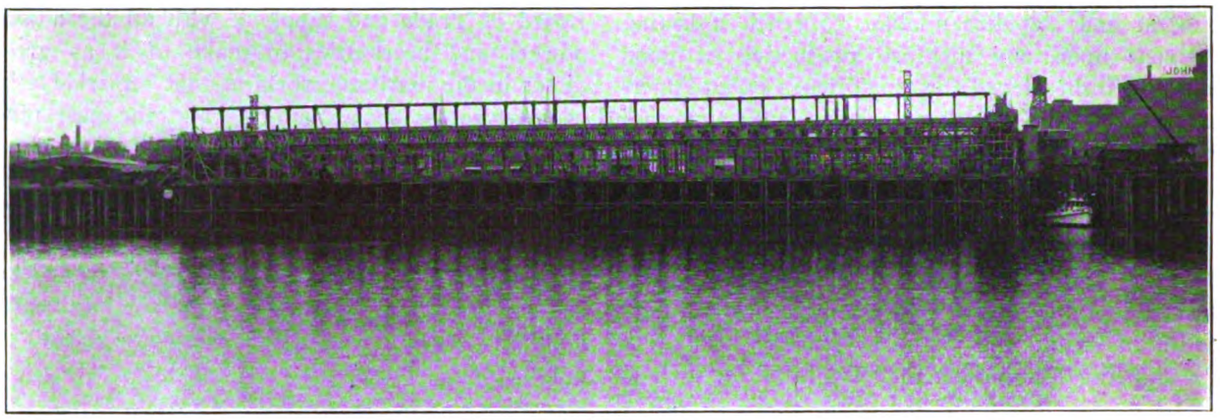
Fifth: Annual retainers of a proper amount to citizen officers and men of merchant vessels of the United States, after the practice that has proved so successful, particularly in the British mercantile marine; and special compensation to steamships not under contract for carrying mails but built on designs approved by the Navy Department and pledged to the service of the Government as fuel ships, supply ships, or transports—so that the Government may be able to control an adequate American auxiliary fleet and a naval reserve of officers and men in time of need.

Sixth: To meet a present condition, an extension of the powers of the existing Bureau of War Risk Insurance to cover marine insurance on hulls and cargoes—with the understanding that this Bureau shall be discontinued when the war has ended.

It is pointed out that the only precedent for Government-ownership and operation of merchant shipping exists in the case of the steamship line owned by the Panama Railroad Company, which in turn is owned by the United States; and that of a small coastwise line owned by the Government of Western Australia. The Australian line lost $114,000 the first year and $96,000 the second year. The Panama line has been operated at a nominal bookkeeping profit of about two per cent. for ten years, with insurance, depreciation, and interest disregarded—all of them imperative charges of a regular steamship concern, which if paid by the Government line would have involved a huge deficit and bankruptcy.

From the above it would appear that the Alexander bill was not very much to Boston's liking.

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Municipal Dock No. 2, now under construction (Photo Feb. 1, 1915). This dock is 526 feet long and has two levels throughout and will be ready for operation about April 1st. Cargo masts and other modern equipment for rapid handling of freight are supplied.

Portland's Recent Harbor Improvements

By G. B. HEGARDT,
Engineer, The Commission of Public Docks.

WHILE this article is primarily written for the purpose of describing the municipal waterfront improvements which are being constructed by the City of Portland, Oregon, it is thought that a brief reference to its harbor, channel approach and navigable waterways will also be of interest to the readers of this publication, as it will give them a clearer understanding of the extent and importance of this port.

The Port of Portland.

Portland is situated at the head of deep water navigation on the Willamette River, 12 miles above its confluence with the Columbia River, and distant 112 miles from the sea—the mouth of the Columbia River.

The Willamette River passes through the city in a northerly course, dividing it into two sections. The main business district is on the West side of this river, where are located the principal industries, railroad freight and passenger depots and terminal yards. At the present time the East side is more of a residence district, although large lumbering plants, flouring mills, grain docks, etc., occupy the waterfront, and manufacturing plants are rapidly expanding and seeking the favorable and less costly sites offered there.

Portland's Harbor.

If both banks of the river within the city limits be included, there is a total waterfrontage of about 17 miles. Of this 11 miles is available for deep water shipping. The work of providing the necessary depth to the docks on this latter frontage is excessive neither in the amount of material to be moved nor as to cost. The material to be dredged is readily handled by suction dredges, as there is an entire absence of rocks or boulders in the harbor area.

If the Willamette River from the city's lower limits to its confluence with the Columbia River is included, the frontage available for deep sea shipping becomes 21 miles, so that greatly increased dockage facilities can be readily supplied when the shipping interests of the Port demand additional berthing space.

The frontage mentioned above is based on quay construction, which will be materially increased by pier and slip construction, which may be used and is contemplated on a considerable portion of the Port's harbor front.

Nearly the entire waterfront is favorably located with reference to easy access to the docks, the elevation of these conforming closely to the grades of the adjoining streets, which makes the matter of providing rail facilities to the docks both convenient and inexpensive.

In the harbor, as is well known, fresh water conditions always obtain, which is a great advantage, not only in construction where wooden piles are used, but also in the effect the fresh water has on removing from ships' bottoms barnacles and other marine growth.

The channel width and depth in the harbor is ample to accommodate the size of vessels which at the present time make the ports of the Pacific Northwest, and the plans of the Federal government and the Port of Portland provide for the further deepening and widening of the harbor in advance of the depth obtained in the ship channel to the sea.

Portland's Channel Approach.

River Channel: As early as 1866 the United States began the work of improving the Willamette and Columbia Rivers below Portland, and in 1877 a definite project was adopted for improv-

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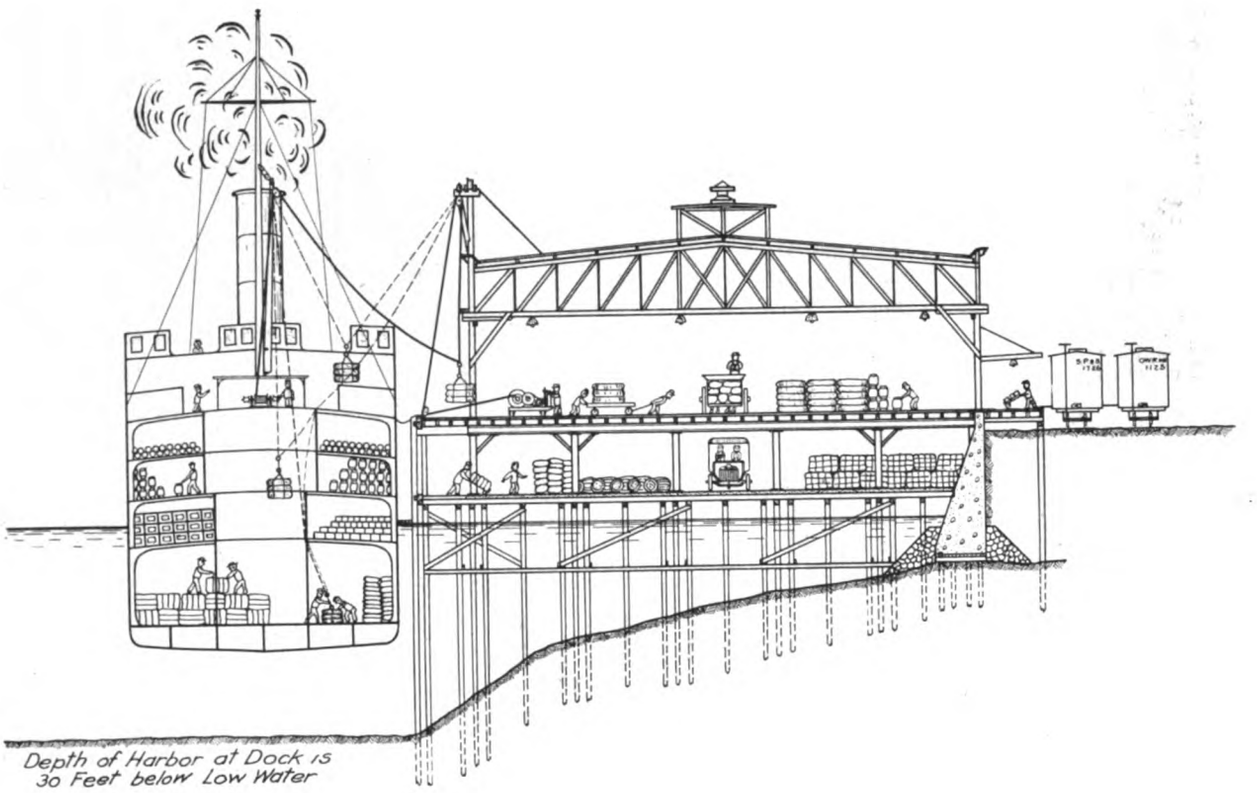


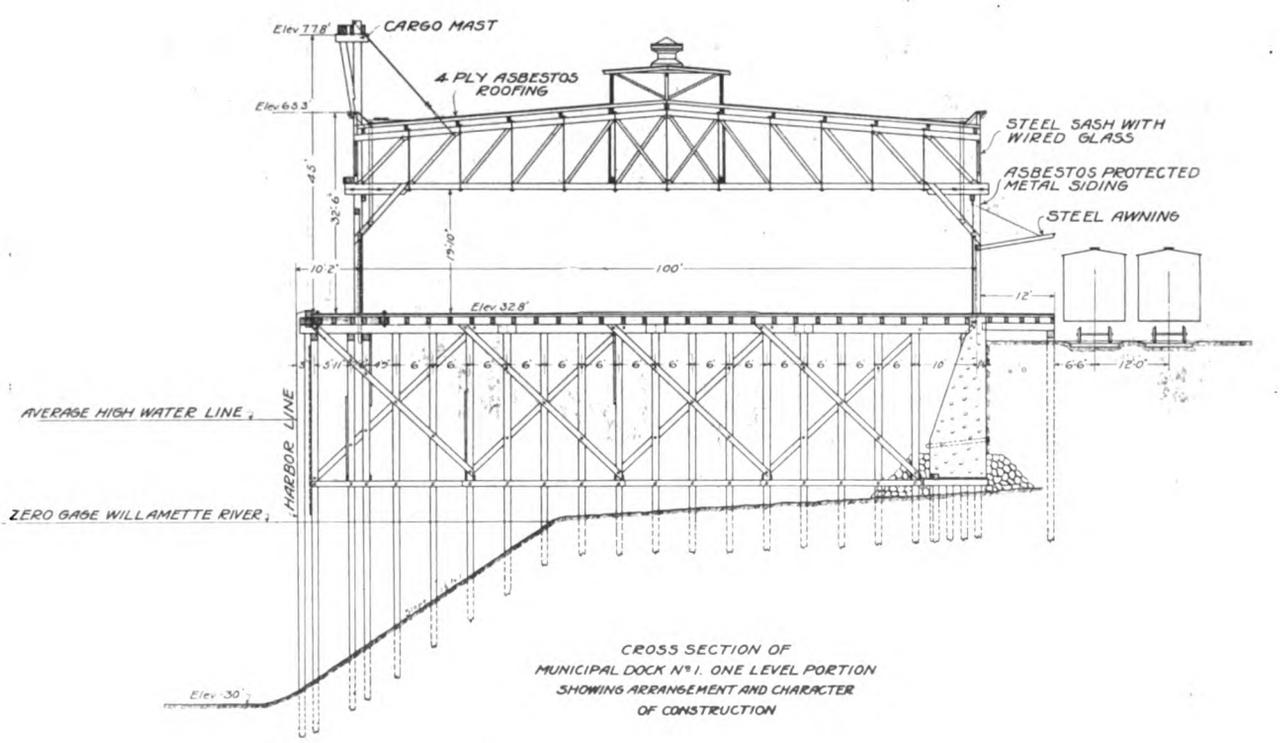
Photo of south end of Municipal Dock No. 1, showing cargo being discharged from forward hatch by use of the cargo mast. The two ship winches are in operation. By use of the dock winch two gangs can operate at a single hatch to different dock doors. The ship booms shown overhanging the platform are not used in the handling of cargo with the cargo mast, there being no swinging of booms necessary.

ing the ship channel of these rivers, covering 12 miles in the Willamette River and 100 miles in the Columbia, by increasing the depth in the shoalest places where there were but 10 to 15 feet at low water, to secure a minimum depth of 20 feet at this stage. In 1891 this project was extended to provide a low water depth of 25 feet. But with the rapidly growing commerce of the Port, it was evident that a greater depth was imperatively demanded to accommodate the larger vessels making the Port, to take care of the constantly increasing business due to the rapid development of the Port's tributary country and the railroad development therein.

At this time the ship channel from Portland to the sea has been deepened to 30 feet and the work of still further increasing the depth, as well as the navigable width of this channel, will

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CROSS SECTION OF
MUNICIPAL DOCK Nº 1. ONE LEVEL PORTION
SHOWING ARRANGEMENT AND CHARACTER
OF CONSTRUCTION

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be prosecuted without interruption. To attain the 30-foot depth only 36 miles of the total distance of 112 miles required improvement, mostly by dredging, of which 9 miles were in the Willamette and 27 miles in the Columbia River. The dredge equipment used in increasing and maintaining the ship channel depth consists of six hydraulic suction dredges with a combined maximum capacity of 100,000 cubic yards in sand in twenty-four hours.

Columbia River Entrance: Due to the presence of very strong currents and large areas of uncontrolled sand spits, the channel at the Columbia River entrance was subject to constant changes in depth and direction prior to the time the improvements undertaken there by the government had become effective. By the construction of a jetty on the south side, now completed, the partial completion of a north jetty, and by dredging, the channel has been established in a permanent direction, and at the present time carries a depth of 31 feet at low water. The projected improvement now being carried out contemplates a low water depth of 40 feet and it is expected this depth will be obtained within the next three years and a 33 to 34 foot depth at the end of this year.

Inland Waterways.

The inland waterways tributary to Portland are practically all situated above the mouth of the Willamette River, the main artery being the Columbia River and the others its tributaries.

The ship channel of the Columbia below the mouth of the Willamette has already been described. Above the mouth of the Willamette, the Columbia River has a least low water depth of eight feet to the Celilo Canal, now under construction, a distance of 92 miles. With the completion of the Celilo Canal, in May of this year, another stretch of this river, to Priest Rapids, 191 miles, with a least low water depth of six feet, will be thrown open for continuous traffic.

One hundred and twenty-four miles above Celilo Canal the Snake River empties into the Columbia. Above its mouth the Snake River is navigable for 146 miles during the greater portion of the year and the project under way will increase this distance to 216 miles, under similar conditions.

Early this year, therefore, above Portland, there will be 283 miles in the Columbia available for river crafts of considerable draft and in the Snake at least 146 for boats of a lighter draft.

At Priest Rapids the Columbia is effectively blocked to navigation and it will require extensive improvements to overcome this obstruction.

The Willamette River is navigable above Portland for 171 miles, during favorable stages, and for a distance of 83 miles at nearly all stages.

It is expected that the full use of these waterways will add greatly to the volume of traffic which will flow in and out of the Columbia River from its constantly growing tributary territory.

Present Port Facilities.

Private Docks: There has already been developed by private interests a river frontage over five miles in length, which is now being used by vessels ranging from river boats and coasters up to the largest ocean-going tramp steamers. This development has taken place on a channel which averages more than 1000 feet in width.

The principal ocean docks for ocean carriers have a depth of from 25 to 35 feet at low water. There are about twenty docks, from which about 90 per cent. of the deep-water shipping is done. These docks, varying in length from 300 to 900 feet, are all of the quay type construction. Several of these docks are equipped for handling freight economically, being supplied with derricks and electric conveyors, and about 90 per cent. of them are connected with rail transportation. Wooden construction is used in these structures, both for substructure and superstructure.

The capacity of the ocean docks varies from 10,000 to 25,000 tons and the largest coal bunker has a storage capacity of 15,000 tons.

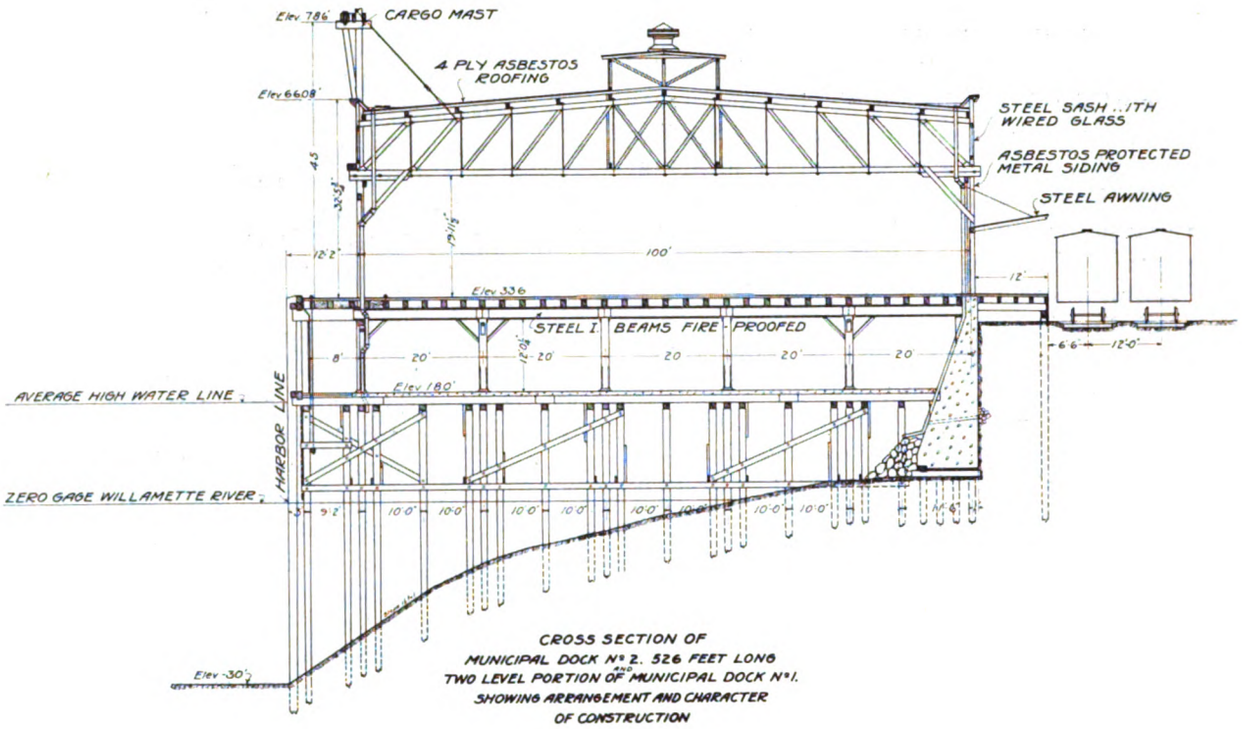
Dry Docks: The Port has two dry docks. The Port of Portland has a floating dry dock just below the city limits. It has a capacity for lifting a ship weighing 10,000 tons; its length is 468 feet, inside width 82 feet and depth over keel blocks of 25 feet.

The Oregon Dry Dock Company owns and operates a one-piece floating dock having a length of 340 feet, width of 60 feet and depth over keel blocks of 18 feet. Its dead weight capacity is 3500 tons. Adjoining this dry dock is a large, up-to-date boiler and machine shop and shipbuilding yard, also capable of handling repair jobs of any magnitude.

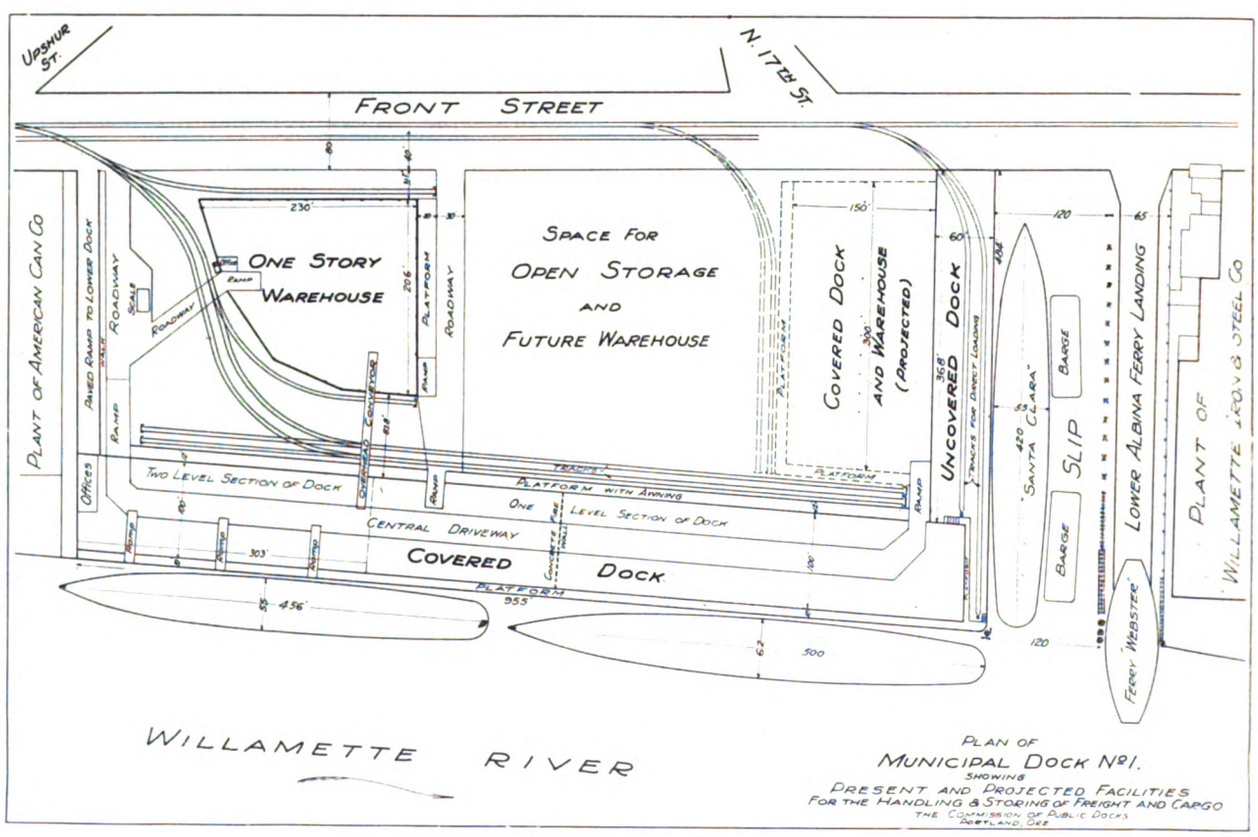
Municipal Docks.

Motor Boat Landing: The first construction undertaken by the Commission of Public Docks since its organization late in 1910, was the building of a combined motor boat landing and recreation pier at the foot of Stark street, on the West side of the river. The entire structure is of concrete, with the exception of the foot bridge leading from the street entrance to the barge float used as a landing stage by small water craft. The foot bridge, hinged at the shore end and the outer end resting on the float, is made in three sections, supported at two intermediate points on small counter-balanced wooden floats, which adjust themselves automatically to the varying stages of the river. The concrete structure has two large waiting or recreation rooms with continuous glass sides, affording an excellent view of the river. The motor boat landing and its street and river

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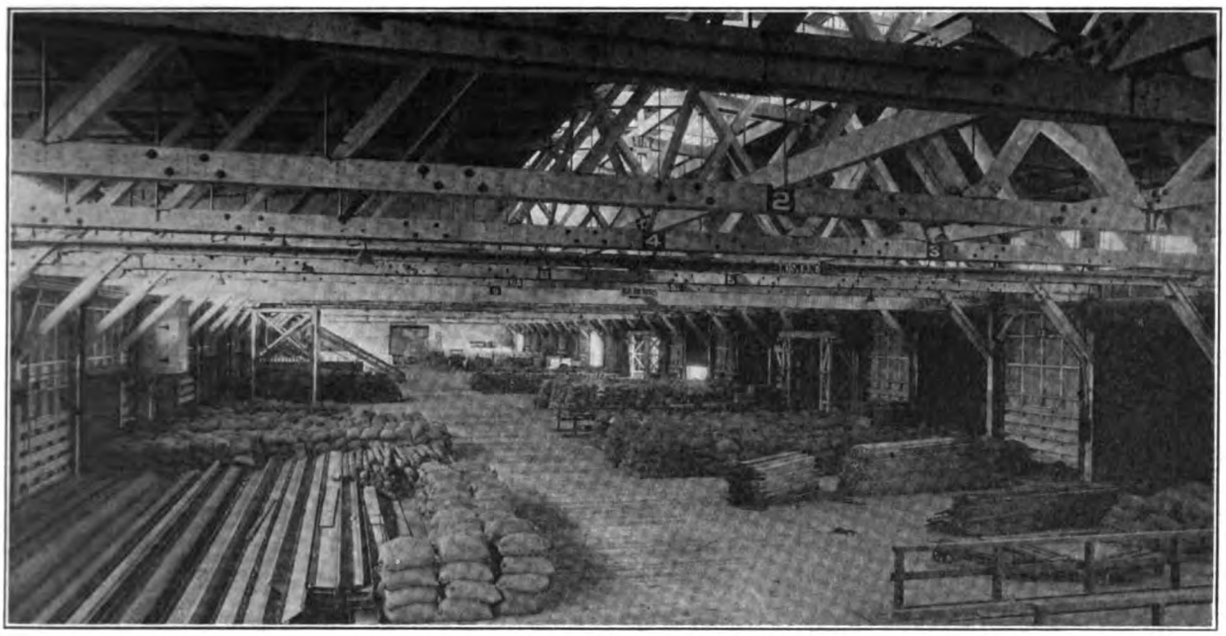


CROSS SECTION OF MUNICIPAL DOCK No 2. 526 FEET LONG AND TWO LEVEL PORTION OF MUNICIPAL DOCK No 1. SHOWING ARRANGEMENT AND CHARACTER OF CONSTRUCTION



PLAN OF MUNICIPAL DOCK No 1. SHOWING PRESENT AND PROJECTED FACILITIES FOR THE HANDLING & STORING OF FREIGHT AND CARGO. THE COMMISSION OF PUBLIC DOCKS, PORTLAND, ORE.

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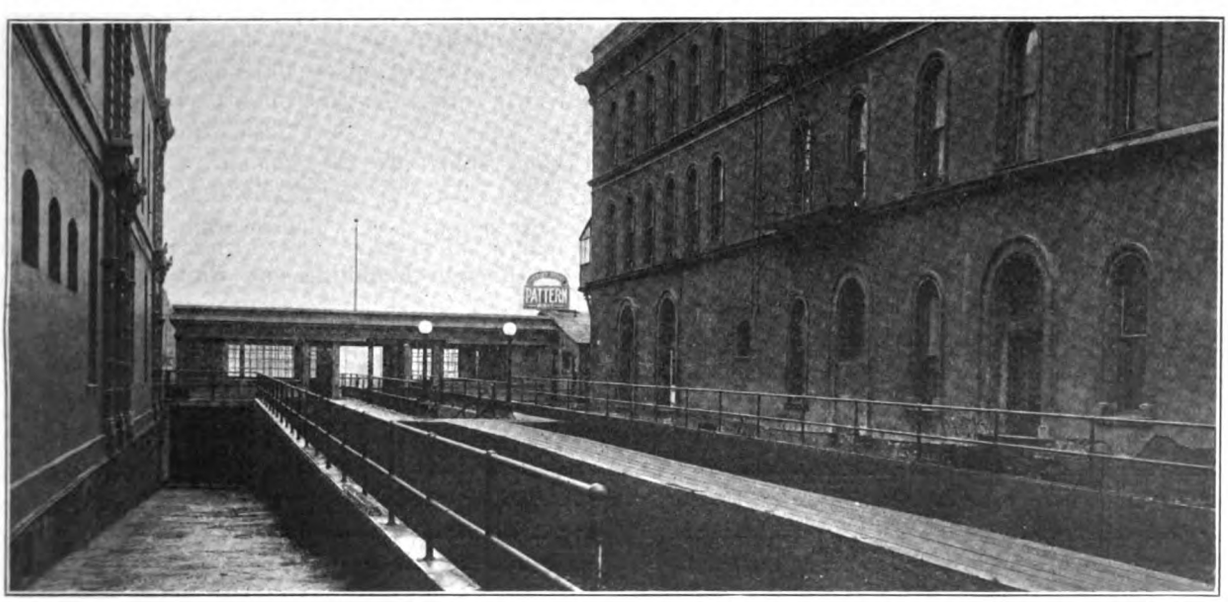


Municipal Dock No. 1, interior view, looking north from south end of dock; showing adjustable ramps, elevator and conveyor to warehouse.

approaches are well illuminated and the rooms are supplied with heating plant, thus forming a pleasant waiting place for the arrival of boats and launches.

Dock No. 1: The principal work accomplished by the Dock Commission is the construction of Dock No. 1, also on the West side of the river, which has just recently been completed. The complete layout of this installation, as it will appear when the additional work projected, which will be done with the funds available, has been completed, is shown on accompanying plan. Briefly stated, this installation furnishes a quay dock having a length on the harbor line of 955 feet, sufficient to accommodate at one time two large vessels, and in the slip, without extending beyond the harbor line, another vessel about 450 feet in length.

The 955 feet long quay dock is primarily designed for coastwise and ocean vessels of the largest type entering the port; but at the same time, provision has been made for the convenient handling of freight from river craft, whose importance is recognized as mediums at all docks for the assembling of outbound freight and for the distribution of cargoes received from ocean ships. For this reason, 300 feet of the dock is a two-level dock, the upper level at 32 feet and the lower level at 18 feet above low water. The southerly 655 feet is a single level structure, with deck surface placed at elevation 32 feet. A high level dock of 955 feet in length is thus provided for large steamers, yet affording berthing space for one or two river steamers. The fluctuations in the river, due to annual freshets in the Willamette and



Municipal boat landing from Front street looking towards the harbor. The structure is of reinforced concrete construction, with waiting and rest rooms, harbor master's office, etc. The white marks on corner of building show the record high water in 1904.

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Columbia Rivers, necessitate the placing of the upper level of docks at such high elevation above low water.

The slip at the north end of the quay dock is 120 feet in width and 484 feet in depth, and along its south line has an open dock 60 feet in width, extending from the quay dock to the street, which will furnish ample space for the handling and storage of bulk freight. The open dock has two tracks along its face for the direct transference of freight between vessel and cars and vice versa.

It had originally been intended to use the ground in rear of the open dock for storage purposes, in addition to that provided on the open dock, but with the constantly increasing shipping of the port there also comes a demand for additional shed space. The commission has, therefore, found it necessary to construct a shed or warehouse directly in rear of the open dock 150 feet in width by 360 feet in length, joining the shed of the quay dock and extending to Front street, and plans for its construction are now in preparation. Such a shed in this location is believed particularly advantageous to the Port, as it will enable a vessel to discharge its cargo, of whatever character, bulk material being loaded directly into cars or placed on the 60-foot wide open dock, and its general or merchandise cargo into the shed or warehouse, without the necessity of the vessel making a move or changing its berth.

In connection with this shed or warehouse there will be installed a system of cargo masts of a greater height than those on the other municipal docks, which will furnish the means of landing vessel's cargo at any point on the open dock or into cars, without rehandling, and also at the face of the shed or warehouse.

The original project of the commission for the expenditure of the funds voted for dock and other waterfront improvements included the construction in rear of Dock No. 1 of a reinforced concrete warehouse, five stories in height, at an estimated cost of $180,000.00. After a careful study of the subject the commission decided that the interests of the Port and the business which would have to be cared for for several years did not justify such extensive construction or large expenditure of money at this time. Instead the commission authorized the construction of a one-story, heavy mill constructed warehouse, equipped with sprinkler system, of the same ground area as the proposed concrete warehouse, or about 38,000 square feet.

Dock No. 2: On the East side of the river there is now being constructed and nearing completion a two-level quay dock having a length of 526 feet. It is of the same general design and construction as Dock No. 1, previously described, with certain modifications which will later be reverted to. There is a dredged depth at both docks 1 and 2 and in the slip of about 30 feet at low water.

Type of Construction.

The superstructure of both Docks 1 and 2 is of heavy mill construction, supported on wooden piles. At the rear of the docks a concrete wall is provided, the full length of the structure, to retain the fill placed between the dock and the first parallel street. At each end of the docks there is a reinforced concrete wall, and in the case of Dock No. 1 an intermediate fire wall, extending from about low water to a height of six feet above the rake of the roof of the shed. The end fire walls are provided to protect the structures against fire on adjacent docks, both as to the sub and the superstructure. In addition to the end fire walls, fire stops, extending from low water to the under side of the dock floor, are provided at intervals as retardents against the sweep of fire underneath the docks, and on the face of the docks a three-inch planking, laid with four-inch spaces, from low water to the top floor of the dock, protects the structure from fire and drift from the front.

Double thickness of tongued and grooved flooring is used in all dock construction, and where the dock is a two-level structure, the upper floor is water proofed, using two layers of building paper, well swabbed with asphalt, between the two layers of flooring, to prevent damage to goods on the lower floor from leakage caused by the sprinkler system and from other causes incident to dock operation.

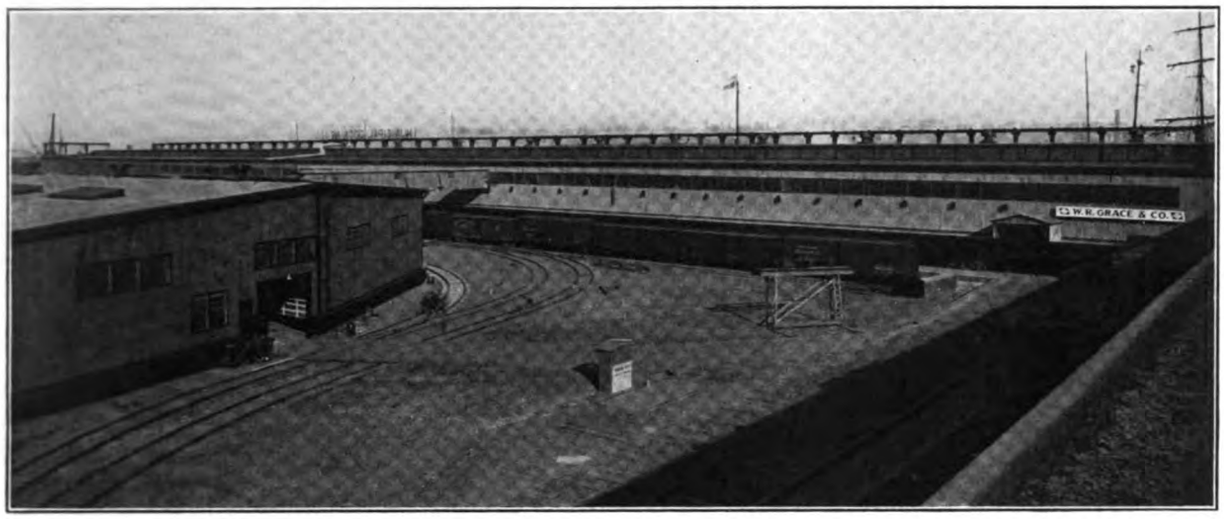
In the case of Dock No. 2 a radical departure was adopted in the construction of the floor of the lower level. It consists of a reinforced concrete slab, supported on creosoted timbers, a construction that should be permanent so far as the life of the structure itself is concerned. As the elevation of the lower deck is only 18 feet above low water, it is, at times, subject to overflow, and in this respect the concrete floor should have a distinct advantage over the customary wooden floor.

The sides of the dock sheds are covered with asbestos protected metal, and the sheds sprinkled and provided with other efficient fire protection facilities. Steel roller doors, steel sash with wire glass and asbestos roofs are the standard for all dock construction. Due to this nearly fireproof construction, the city enjoys a very low insurance rate.

Freight Handling and Rail Facilities.

For the expeditious and economical handling of cargo the commission has adopted the latest and best practice followed by the most modern dock construction in the principal Atlantic Coast ports. For this purpose it has provided at both of its docks what are known as cargo masts or hoists on the harbor face of the docks. These cargo masts are used either entirely in connection with the ship's gear, or by a combination of the ship's gear and electric dock winches, of which four are already installed on Dock No. 1. These winches have a rated capacity of 31 horsepower and are operated with direct current, for

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Municipal Dock No. 1, rear view. Showing one story warehouse with 38,000 square feet of floor space and track layout serving dock and warehouse.

which purpose a rotary converter plant has been installed, sufficient for the concurrent operation of eight winches. Power outlets are provided at every door opening on the river side of the docks for the "plugging in" of the electric dock winches.

The method of handling cargo by the use of the cargo masts is exceedingly simple and effective. It is very positive in action for when the line of the ship's boom is carrying the load the cargo hook is directly in position over the hatch and when the line through the cargo mast block is carrying the hook is directly over the door of the dock shed. There is no swinging of booms to be carefully gauged, and there is no doubt about the location where the cargo will be when either one line or the other is carrying. It will then be readily seen that by this method it is immaterial whether the position of the hatch is directly opposite the door in the dock shed, in discharging or loading a vessel, in either of which operations the cargo masts perform the work with equal facility.

With dock winches and cargo masts it will also be possible to work two gangs to the hatch, thus reducing the time required to discharge a vessel.

In the two-level section of Dock No. 1 there is installed one 3-ton elevator with platform 8′ x 14′ and in Dock No. 2 two elevators of the same capacity and dimensions.

In connection with the warehouse at Dock No. 2 an electrically operated conveyor is provided for the direct transference of freight between the warehouse and the dock capable of handling grain in sacks, flour, case goods, wire, etc., and in the warehouse portable gravity conveyors for distribution of goods will later be supplied if the business done and commodities to be handled warrant such an installation. As an additional facility for the handling and distribution of freight to the warehouse there are two two-ton electric trucks to handle such commodities as cannot be transferred by the conveyor, and for the transportation of goods from distant points on the dock to the conveyor. Trailers will be operated in connection with the electric trucks to expedite the transfer of goods and reduce the operating expense.

At Dock No. 2 dock winches and electric trucks will not at once be included in the mechanical equipment of the dock, but they will be supplied when the demand for such service is more apparent.

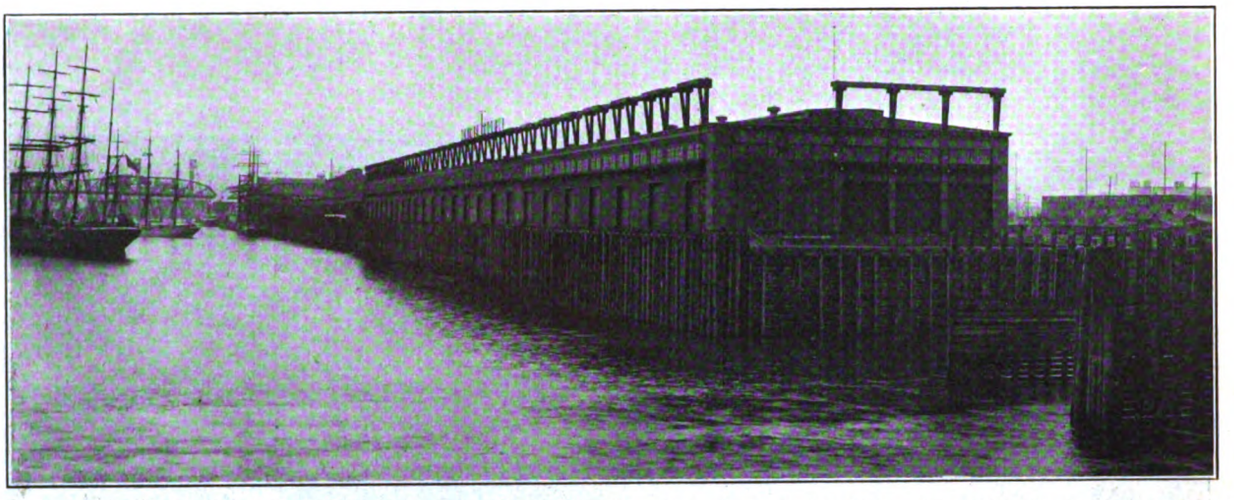
The two tracks in rear of Dock No. 1 will accommodate at one time twenty-seven 50-foot cars. Should these trackage facilities at any future time prove insufficient to handle the dock's rail business, provision has been made in the marginal way running parallel with the rear of the dock to permit of the construction of a third track. It will be noted that this dock has three entrances and exits connecting with Front street, which eliminates to a great extent congestion from team traffic.

There are two tracks at the open dock along the



Harbor view of municipal boat landing showing adjustable float with automatic adjustable bridge.

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Harbor view of Municipal Dock No. 1. Length, 955 feet; width of dock shed, 100 feet; width of dock, including platform, 122 feet. Slip in foreground is 120 feet wide and 484 feet long, with 60 foot uncovered dock adjoining on the south.

slip at the north end of Dock No. 1, which furnish placement for 15 cars which, in the case of lumber shipments, will enable some 300,000 feet of lumber to be assembled for loading out. A twenty-ton locomotive crane will be installed here for handling heavy bulk material and also for the purpose of loading into cars such material which may have been stored on the open dock awaiting shipment.

At Dock No. 2 there will be three parallel tracks in rear of the dock to serve both the dock and a contemplated warehouse, and entrances to both levels of the dock at each end of the structure insures complete circulation of team traffic.

Cost of Improvements.

With the creation of the Commission of Public Docks the people voted the issuance and sale of $2,500,000 of dock bonds, the proceeds of which were to be used for the purpose of providing the port with modern dock facilities. At this time there has been expended in the purchase of dock sites and for construction, completed and under contract, approximately $1,900,000. The available balance is being held in reserve to be used for warehouse construction or for such additional facilities and mechanical equipment as the development of shipping may later indicate as necessary for the best interests of the Port.

Future Work.

In order to be prepared to furnish additional dock facilities to meet the demands of shipping in advance of actual needs, the commission has already had prepared tentative plans for such development, with the view of going before the people for the funds necessary to provide such facilities in definite locations.

The grain exporters of the port have made representations to the commission to provide elevator facilities for the handling of grain in bulk, and the commission will submit to a vote of the people at the general election in next June an amendment authorizing the issuance of bonds in the amount of $900,000 for the construction of a grain elevator and other necessary waterfront improvements connected with such an installation, if the exporters will agree to lease the facilities provided for a certain period of years, on such terms as will produce sufficient revenue to pay interest on bonds, amortization charges, insurance, upkeep and operation.

The several drawings and photographs which accompany this article will show the general layout of the different improvements which have been completed or are at this time contemplated to be constructed in the immediate future.

A recent launching of interest to the west coast was that of the two-decked freighter "Sinaloa," built to the order of A. G. Lindvig of Christiania and intended for the Mexican, Central and South American service of C. Henry Smith, Incorporated. The principle dimensions of the "Sinaloa" are: length 275′-0″, beam 38′-6″ and depth molded 20′-3″. There are four cargo hatches, each served with double derricks fitted on cross tree tables and worked by six steam winches. A steam winch is fitted on the poop for warping stern lines and there is a steam windlass on the forecastle head. The steam steering gear is located in the after end of the engine-room casing, with a hand steering gear aft.

The vessel is driven by a triple expansion engine with cylinders 20″-33″-54″ and a stroke of 36″. Steam is supplied by two Scotch boilers at 180 pounds pressure and the furnaces are especially fitted for burning either oil or coal. The oil fuel is carried in the double bottom compartments with the exception of the compartment under the boilers, which is utilized for make-up feed. The oil compartments are fitted with steam pipes and all the suctions are surrounded with steam coils in order to secure an easy flow to the pumps.

The "Gazette," Montreal's oldest newspaper, recently issued their commercial review of the Port of Montreal for 1914. The volume is one of nearly two hundred pages, well illustrated, and the subject matter contains a great deal of interesting and instructive matter.

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The "Great Northern" coming in to her dock at San Francisco. Photo by Geo. W. Miller

The "Great Northern"

THE arrival of the steamer "Great Northern" at San Francisco proved of great interest to steamship men up and down the coast, and the performance of this vessel and her sister-ship the "Northern Pacific" will be eagerly watched. Designed for a sea speed of 23 knots, with passenger accommodations for 856 people and a freight capacity of 2,185 tons, the new craft are expected to make the run from Flavel, their Columbia River terminal, to San Francisco in from 25 to 26 hours. At the former port a new pier 600 feet long and having a one-story covered shed 80 feet wide for its full length had been built. Railroad connections are of course provided, and the loading and unloading of freight will be accomplished mainly through the side ports by means of inclined elevators. On account of the fact that these vessels will, in the Summer season, be called upon frequently to buck heavy head winds and seas, they have a very high freeboard and a pronounced flare forward. As the north Pacific weather is rather raw in the Summer, a great deal of inclosed promenade space has been provided, an innovation that is bound to prove acceptable to the traveling public. The construction of the vessels has been carried out under the direct supervision of Mr. C. C. Lacey, Marine Superintendent of the Great Northern Steamship Company, while Mr. W. A. Dobson, Naval Architect of the Cramp Shipyard, deserves great credit for the successful carrying out of the steamship company's ideas.

These two vessels are 524′ 0″ in length over all, 500′ 0″ between perpendiculars, beam 63′ 0″, depth moulded to A deck 50′ 8″, draft loaded 21′ 0″, deadweight carrying capacity 2,185 tons, cargo capacity approximately 200,000 cubic feet, shaft horsepower 25,000, contract speed 23 knots, passengers 550 first, 108 second and 198 third; crew 198; total on board 1,054, and gross tonnage 8,255. Steam is supplied by twelve Babcock and Wilcox boilers arranged in two boiler-rooms, six in each. These boilers are oil-fired and the contract requirements call for sufficient steam for 23 knots from ten boilers, two standing by as spares. The oil for fuel is carried in wing bunkers alongside the boilers, being a similar arrangement to that of the Pacific Coast Steamship Company's steamer "Congress." There are ten transverse watertight bulkheads, all of which extend to the upper or D deck or higher. In these bulkheads there are no doors below the line of D deck except the shaft alley

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and fireroom doors. These are operated on the Stone-Lloyd system.

Boilers.

Steam is supplied at 220 pounds working pressure by specially designed water-tube boilers of the Mosher type constructed by the Babcock and Wilcox Company. They are arranged in rows of three facing the center of the ship, and providing a central fore and aft fireroom 11′ 2½″ wide by 65′ 0″ long. The total space occupied by the boilers is 130′ 0″ by 41′ 6″. Each of the twelve boilers contains 5,000 square feet of heating surface. The steam-drums are 54″ in diameter with heads bumped to the same radius. Each boiler has 969 generating tubes 2″ in diameter of No. 8 B. W. G. Their ends are expanded into the steam and water drums. The boilers operate under forced draft on the closed stoke-hold system. Three Sturtevant turbo-blowers are located in each fireroom. The turbines are direct connected to 34″ high speed cone fans and each unit delivers 30,000 cubic feet of free air per minute against a pressure of 2″ of water. These units operate at 180 pounds steam pressure and are equipped with emergency safety governors. Two of the units in each fireroom are sufficient to supply draft air for full power, the third being a standby. The Koerting mechanical oil-burning system supplied by the Schutte, Koerting Company is used. The oil fuel is taken from the storage tanks and on its way to the fuel pumps passes through duplex suction strainers and then passes through a superheater using live steam. The burners are of the centrifugal spray type fastened to adjustable air registers. The products of combustion are carried off by two stacks, each serving six boilers, whose tops are 112 feet above base line.

Main Engines.

The propelling machinery consists of one high and two low pressure Parsons turbines arranged on three shafts and capable of developing 25,000 horse-power at 325 revolutions. Steam from the boilers is supplied through two main pipes connecting to the inlet belt of the high pressure turbine and also to the inlets of the two low pressure turbines for maneuvering purposes. Astern turbines are incorporated in each of the low pressure turbines, and the steam connection to the astern turbines and the low pressure ahead turbines lead from a double maneuvering throttle at the working platform, so arranged that in maneuvering ahead or astern both valves will be operated from a hand wheel. The main steam connection to the high pressure turbine is controlled by a single balanced throttle valve at the working platform.

The high pressure turbine is 21′ 7½″ long, the outside diameter of the rotor drum being 5′ 8″. The cylinder is of close-grained cast iron and the rotor drum is a steel forging. The wheels are of cast steel annealed and the shaft of open hearth forged steel. There are four stages of expansion with sixteen rows of blading in each stage. The diameter of the rotor at the tips of the blades of each stage is 5′ 11″, 6′ 0¼″, 6′ 2″ and 6′ 4½″. The total length of each of the low pressure ahead and astern turbines is 32′ 2″, the low pressure drums being 7′ 8″ outside diameter and the astern drums 6′ 7″ in diameter. The line shafting is 12¼″ in diameter. Lubrication of the turbine thrust and spring bearings is carried out at a pressure of 10 pounds, oil being supplied from a 2,000-gallon gravity tank. This tank is supplied by two steam-driven pumps which draw from the inner bottom or from drain tanks. Two oil coolers of the quadruple flow type and having a cooling surface of 360 square feet are utilized for cooling the main engine lubricating oil. The two main condensers each have 13,046 square feet of cooling surface. An auxiliary condenser is provided for port use. There is one air pump for each condenser of the twin beam, vertical, single-acting type, supplied by the Blake and Knowles Steam Pump Works, with air cylinders 32″ in diameter, steam cylinders 14″ in diameter and a stroke of 21″. The auxiliary air pump is of the vertical simplex featherweight type 7½″ by 14″ by 10″. The cooling water for each condenser is furnished by a 26″ engine-driven centrifugal pump.

Auxiliaries.

The auxiliaries on the "Great Northern" and "Northern Pacific" are very complete and include the following units:

Four main feed pumps, vertical simplex, Weir type, 15½″ by 9¾″ by 24″, furnished by Blake and Knowles.

Two auxiliary feed pumps, vertical duplex, 12″ by 8½″ by 12″, furnished by Blake and Knowles.

Two bilge and ballast pumps, vertical duplex, 7½″ by 9″ by 10″, furnished by Blake and Knowles.

Two lubricating oil pumps, vertical simplex, 6″ by 8″ by 12″, furnished by Blake and Knowles.

Four fuel oil service pumps, horizontal duplex, 7½″ by 5″ by 10″, furnished by Blake and Knowles.

Two oil transfer pumps, vertical simplex, 6″ by 8″ by 12″, furnished by Blake and Knowles.

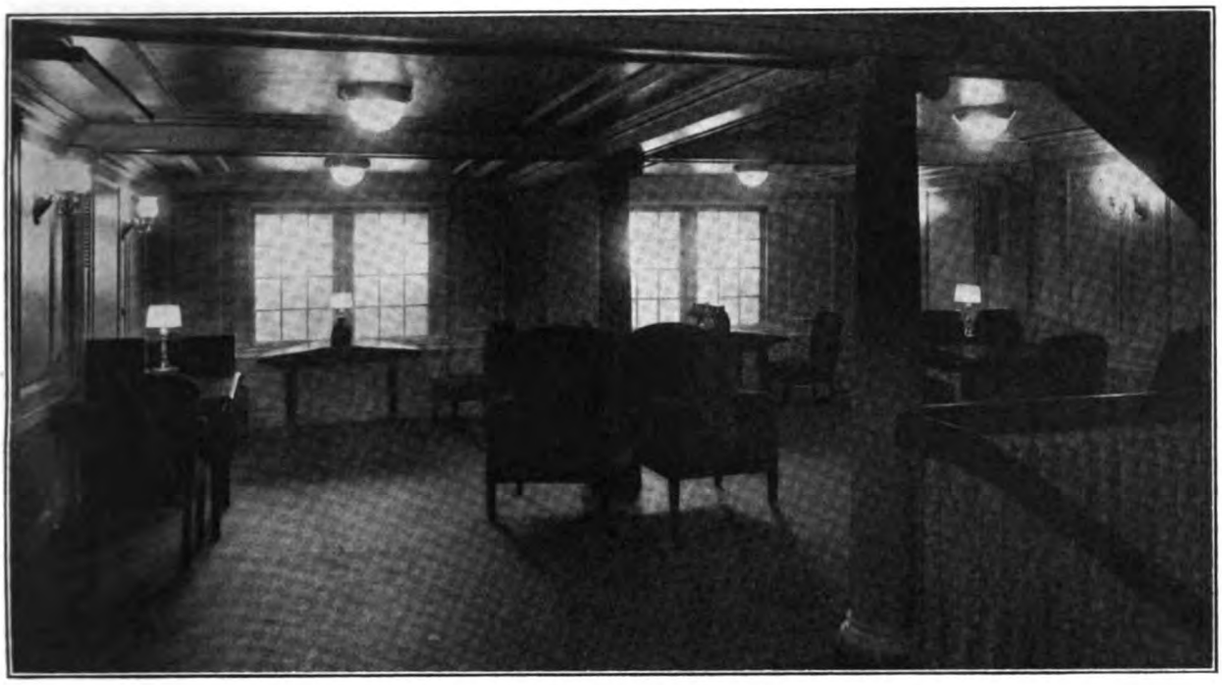
Two brine pumps, vertical duplex, 5¼″ by 5″ by 5″, furnished by Blake and Knowles.

One donkey boiler feed pump, horizontal simplex, 4½″ by 2¾″ by 6″, furnished by Blake and Knowles.

One evaporator feed pump, horizontal simplex, 4½″ by 2¾″ by 6″, furnished by Blake and Knowles.

Two fresh water pumps, horizontal simplex, 5½″ by 5½″ by 7″, furnished by Blake and Knowles.

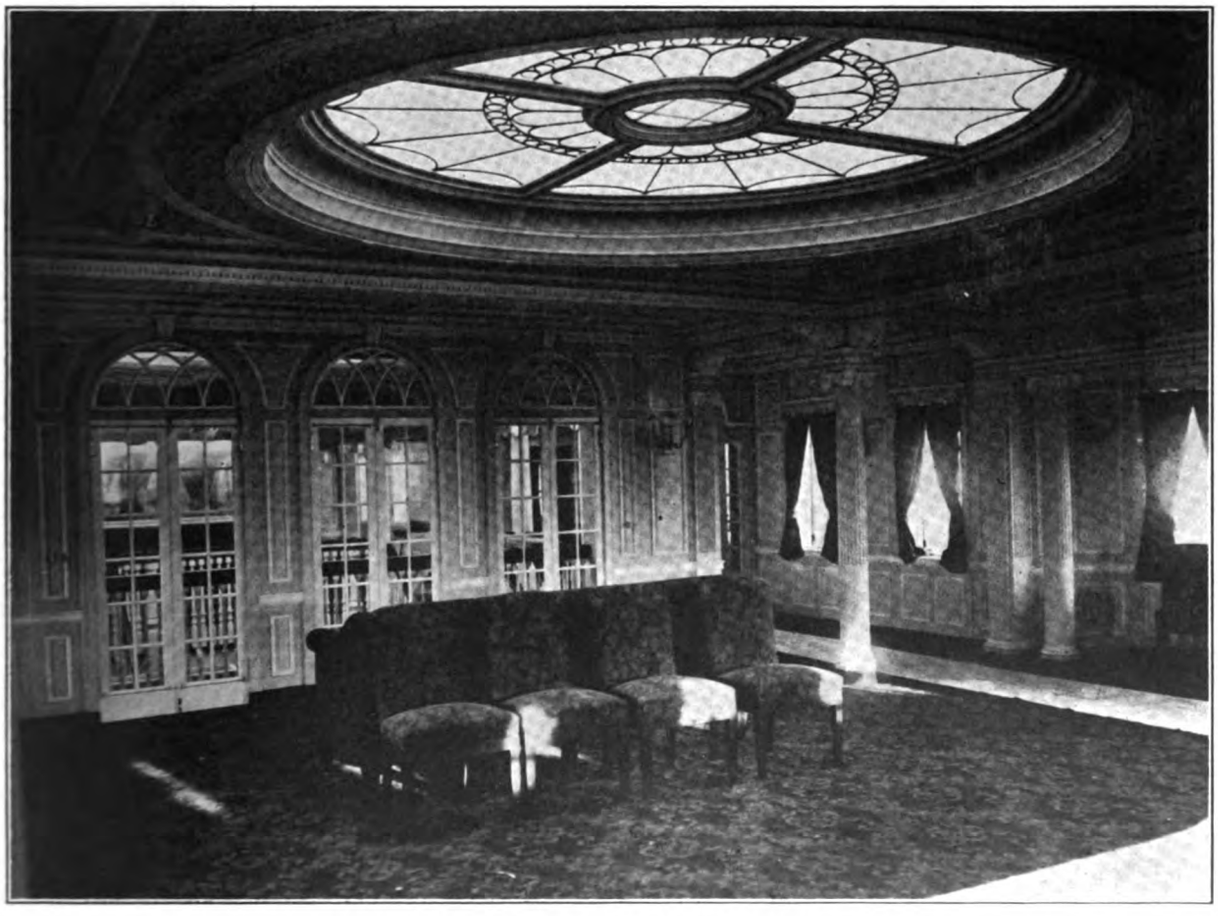
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The writing room is light, airy and comfortable.

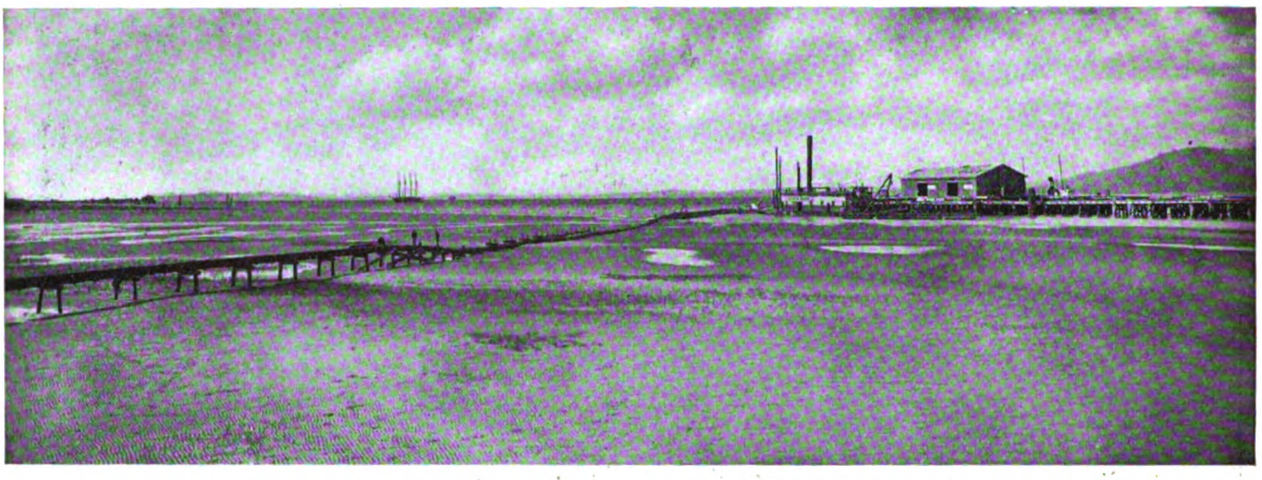
One ice water circulating pump, horizontal simplex, 3½" by 3½" by 4", furnished by Blake and Knowles.

There are two 4" Worthington centrifugal sanitary pumps designed to handle 500 gallons of salt water per minute against a head of 100 feet. These pumps are driven by a standard Terry type Z turbine, delivering about 20 horse-power at 2,750 revolutions and designed to operate with 175 pounds initial pressure, but capable of delivering the required power at 220 pounds initial pressure and 5 pounds back pressure.



A corner in the first class lounge.

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Flavel, the northern terminal of the "Great Northern," and her sister ship, the "Northern Pacific."

There are two feed water heaters of the Reilly multicoil type furnished by the Griscom-Russell Company. Each of these heaters can handle 150,000 pounds of feed water per hour to a discharge temperature of 208 degrees when furnished with steam at 5 pounds pressure. There is also a Reilly multicoil horizontal Navy type evaporator 4′-4″ diameter by 6′-7″ high, capable of furnishing 25 tons of fresh water per day.

There is a complete CO2 refrigerating plant, manufactured by J. & E. Hall Company, Limited, consisting of two No. 9 machines for refrigerating one cargo hold and the ship's stores. There are two hot water generators, one for fresh and one for salt water service. These are of the straight tube multi-pass type manufactured by the Griscom-Russell Company. Each unit has a capacity of 150 gallons of water per minute heated from 50 to 130 degrees with steam at 5 pounds pressure.

Electric Plant.

The electric plant consists of four 35-K.W. 110 volt generators furnished by the Diehl Manufacturing Company, direct connected to Terry type



One of the rooms of a connecting suite.

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First class Observation Room. French windows add to the cheerful attractiveness of this lounging place.

"GM" turbines manufactured by the Terry Steam Turbine Company. The turbines are designed to operate normally with 200 pounds steam pressure with a 28" vacuum, although they will carry the required load with 175 pounds of steam and a 26" vacuum and are capable of operating at an initial pressure of 220 pounds. The normal operating speed of these sets is 3,200 revolutions. This plant supplies current for lighting the ship, operating five freight elevators, a Willets-Bruce automatic whistle, and numerous galley machines.

Deck Auxiliaries.

The steam steering gear, windlass, capstan and hoisting winches were all supplied by the American Engineering Company of Philadelphia. The steering engine is of the differential type with cylinders 14" in diameter by 14" stroke, controlled by an automatic reverse valve. The steering engine can be operated directly at the engine itself or by telemotor from the wheel house.

Passenger Accommodations.

The outstanding feature of the passenger accommodations on the "Great Northern" is the fact that one entire deck is practically given over to the public rooms and promenade for first class passengers. Above this deck is the boat deck, which is reached by the after grand stairway. The boat deck has a house forward for the captain and deck officers and above this again is the wheel house and chart room. On the highest passenger, or A deck, from forward aft will be found the following: On the deck forward are located a 10" by 10" windlass and two 8" by 8" capstans. Immediately aft of number one cargo hatch is a breakwater and aft of this again is the foremast and four 8" by 10" cargo winches. At the forward end of the superstructure is a curved steel bulkhead which divides the first class quarters from those occupied by the third class passengers and crew. For 125 feet aft of this shield the promenade is inclosed with sliding glass windows, giving

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protection from cold winds. Within this inclosure are located the main lounge, observation room and lobby. These rooms are all in the colonial style. The color scheme in the observation room is green and old ivory and in the lounge there are old rose carpets and tapestries. Both these rooms have large and attractive skylights. The lobby serves as a main entrance to the hotel part of the ship and is at the head of the forward grand stairway leading down through four decks to the main dining saloon. Aft of the first class lounge and abreast the engine-room hatch are 14 bachelor apartments arranged in groups of two state rooms with private toilets and shower baths between. Further aft of an A deck is the first class smoking room, finished in natural oak. The floor is of Dreadnought tiling of soft, warm colors harmonizing with the russet brown leather furniture. A large open fireplace adds to the cheerfulness of this apartment. Just abaft of the smoking-room is a deck verandah with glass sides and the after end open to the weather.

At the extreme forward end of "B" deck is the third class dining-room, aft of which is a large open space through which the hatches to number one and two holds are trunked. This contains the third class lavatories. From frame 48 aft to frame 157, B deck is given over to first class state rooms and suites consisting of bedroom, sitting-room and bath. Aside from the suites, the rooms are finished in white enamel, with doors and chair rails of mahogany. The hallways and lobbies throughout the passenger accommodations are laid in Dreadnought tiling and rugs. Aft of frame 157 are the second class public rooms, consisting of smoking-room, lobby and lounge. These rooms are handsomely furnished and completely surrounded by the second class promenade. At the extreme after end of this deck are located two warping capstans and a hand steering gear. The public lavatories, baths and showers for men and women on this deck, as well as on the deck below, are located amidships between the two uptake casings.

Forward on C deck are quarters for third class passengers, sailors' mess and quarters, as well as quarters for some of the steward's kitchen crew. The first class accommodations on this deck are similar to those on the deck above both as to appointments and arrangement, but there are no suite rooms on C deck. The purser and chief steward have rooms on this deck adjacent to the forward stairway. Aft on C deck are located second class quarters, rooms for the engineering officers' quarters and messrooms for the steward's crew and firemen.

Forward on D deck are berths for 130 third class passengers and aft of this is the main dining saloon, seating 278 at four-, six- and eight-chair tables. This apartment is in the colonial style with side alcoves formed by building up partitions on the necessary deep frames. The ports are hidden by inner latticed windows. The dining-room floor is in Dreadnought. The room is finished in white enamel, the tables and chairs being of mahogany. Immediately aft of the first class dining-room and located directly between it and the second-class saloon are the kitchen and pantry. These important features of the ship have been carefully worked out. The ventilation of the galley and pantry is accomplished by means of heavy exhaust fans capable of changing the kitchen and pantry air every two minutes and the dining-room atmosphere every seven minutes. The extensive heating and ventilating system throughout the first and second class quarters is operated on the thermotank system.

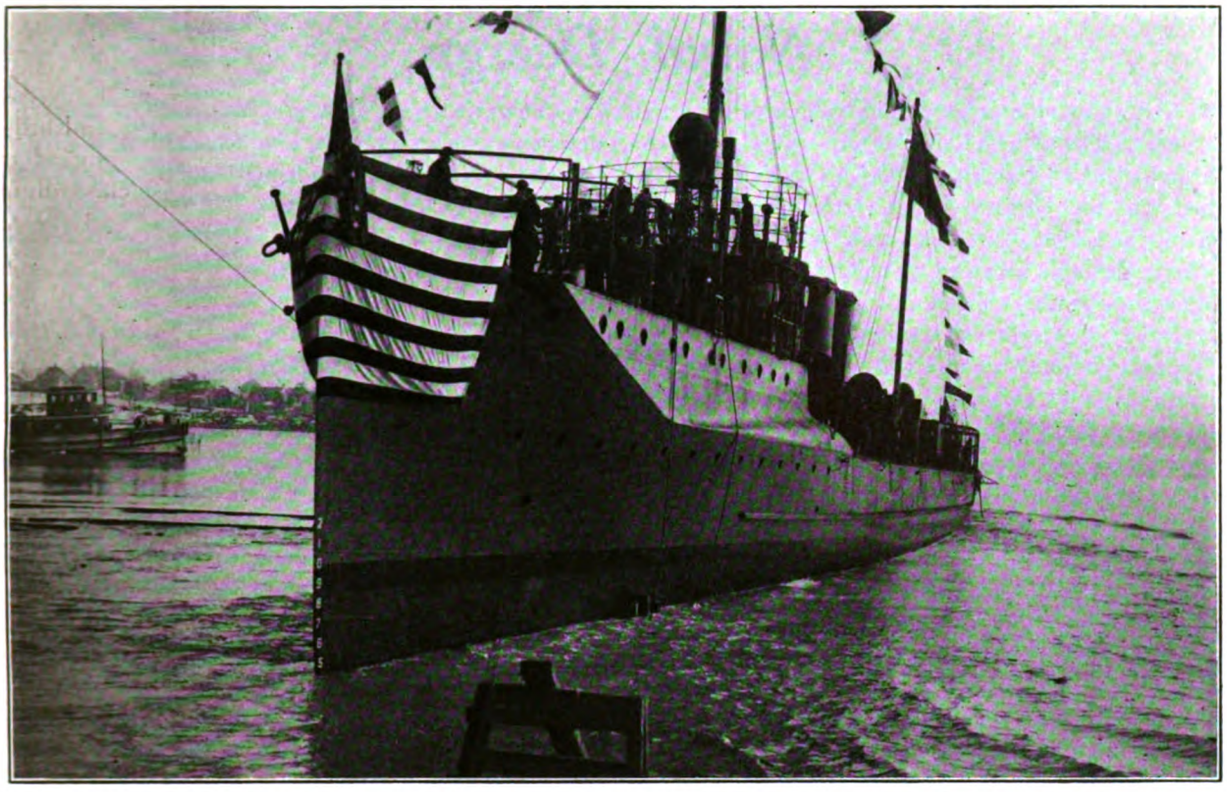
A complete Aero fire alarm system has been installed, including cargo spaces as well as all passenger rooms, lockers, etc. There are three centrals or cabinets from which the copper tubing of the system radiates and alarms are given independently by any one of the three groups of circuits. In other words, should a fire break out aft it would be caught by one of the after circuits and the alarm would be given at the after cabinet, in the pilot house and in the engine-room, but no place else. This would enable the fire to be dealt with in its incipient state without danger of unduly alarming either passengers or crew.

All the stateroom bulkheads throughout the "Great Northern" and the "Northern Pacific" are constructed of "Nevasplit" paneling 7/16" thick, supplied by the Keyes Products Company of New York. In all about 30,000 feet of this paneling was required for both ships. Below the weather deck, the steel decks are covered with from 2 to 3 inches of "Litosilo," a composition that does not absorb moisture to the extent of a wooden deck, and which is thoroughly durable.

UNION IRON WORKS GETS ORDER.

Hind, Rolph and Company have contracted with the Union Iron Works for a two-deck, poop, bridge and forecastle freighter of about 10,000 tons deadweight capacity. Hind, Rolph and Company have hitherto pinned their faith largely on sailing vessels, but as recent losses of these craft have somewhat depleted their fleet, they have decided to go in for steamers. It is understood that the Union Iron Works will build a duplicate of the Rolph boat on speculation. The news of this work has been received with universal satisfaction, and as all the Eastern yards are now quite crowded with new tonnage it is confidently expected that the Pacific Coast shipbuilding firms will feel the boom and that before the end of 1915 will have all their building slips occupied.

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Launch of the torpedo boat destroyer "Cushing."

LAUNCH OF THE "CUSHING."

On January 16th the Fore River Shipbuilding Corporation launched the U. S. torpedo-boat destroyer "Cushing." The "Cushing," known as number 55, is one of a class of six destroyers authorized in 1912. She is 305′ 3″ in length, 31′ 0″ beam, 18′ 3″ in depth, 1050 tons displacement, and 9′ 5½″ draft. She is of the usual destroyer type with high forecastle, a type which is now standard in the navy.

The hull is built entirely of steel and is divided by water-tight and oil-tight bulkheads into fourteen principal water-tight compartments. All the strength members of the hull are of special high tensile steel, which increases the hull strength by about one-third. Fuel oil tanks are incorporated in the vessel's structure capable of carrying about 93,000 gallons of fuel oil.

The armament of the "Cushing" consists of four 4″ rapid fire guns and four twin torpedo tubes. An elaborate electric plant is installed with powerful searchlights and radio telegraph equipment.

In view of the strenuous life experienced during maneuvers and in warfare by the officers and crew of vessels of this type, special attention has been paid to the living spaces and very comfortable quarters are provided for six officers, eight petty officers and eighty-six crew.

The propelling machinery consists of two sets of Curtis turbines in connection with cruising turbines and reduction gears, and a speed of 29 knots per hour is expected without much forcing on trial. Steam is supplied by four water tube boilers of the Yarrow-Fore River type, placed in two water tight compartments, fired by oil fuel and designed for a working pressure of 265 pounds.

The "Cushing" was launched in a well-advanced stage, being about 85 per cent. complete, and her trial is only now a few weeks off.

NEWPORT NEWS BUSY.

The Newport News Shipbuilding and Dry Dock Company report a splendid outlook for 1915 with the following merchant tonnage ordered:

One freight steamship for the New York and Porto Rico Steamship Company of the following dimensions: 347′ 5″ by 46′ 9″ by 25′ 0″ to be a duplicate of the steamship "Lorenzo," previously built for the same firm.

One collier for the Crowell & Thurlow Company 375′ 0″ by 49′ 0″ by 30′ 0″, to be a duplicate of the steamer "Edward Pierce," built for the same firm.

Two twin screw bulk oil steamers of 14,900 tons deadweight, for the Standard Oil Company of New Jersey, dimensions 516′ 0″ by 68′ 0″ by 38′ 0″.

One freighter of 12 knot speed for Edgar F. Luckenbach, 425′ 0″ by 57′ 0″ by 42′ 0″.

One bulk oil steamer for the Standard Oil Company of New Jersey, 460′ 0″ by 60′ 0″ by 36′ 0″, a similar vessel to the steamer "John D. Rockefeller," built for the same firm.

These steamers are all intended for delivery in from nine to sixteen months.

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Naval Design

THE January number of the well-known periodical, "The Navy," is largely given over to criticism of Secretary Daniel's policies. It is claimed that the Secretary's interference with details is having a noticeable effect upon the discipline of the Navy through creating a feeling of unrest and dissatisfaction among officers and men alike. Whether "The Navy" be right or wrong in its contentions, the January number contains a short article under the caption of "The Navy's Responsibility," which is worthy of perusal by anyone who is interested in our naval defenses and which is reproduced below:

"The Navy itself must accept at least part of the responsibility for some of the most serious weaknesses in our battle fleet. The responsibility for the design of the fleet has rested primarily upon naval officers. While it is true that the yearly building program, recommended by the Joint Board, or by the officers of the department, has seldom been granted in full by Congress, the fact remains that for many years back the naval program as put forward by professionals has not included those elements which are now seen to be necessary. It may be said that no one could be expected to foresee exactly what would be required, as has been shown by war conditions of this year, yet certain plain principles have been ignored in the annual recommendations of the naval officers in the department. The result is that at the present time we have a badly proportioned fleet. The fighting force of the Navy to-day is represented mainly by battleships, with a secondary assistance of destroyers, and an inadequate strength in submarines. The theory on which the Navy has been acting for some years seems to have been that there was so little likelihood of getting out of Congress a properly proportioned program providing the needed units year by year, that it was necessary to concentrate efforts upon getting battleships with the idea that other types of vessels would come later. The scout cruiser and commerce destroyer has all but been ignored and the battle cruiser of high speed and heavy gun power with limited armor protection is unknown in our fleet. In other words, the type that some believe now threatens the supremacy of the Dreadnaught has been absolutely omitted from the program.

"The only defense of this theory of fleet composition which can be entertained with any seriousness is that, our Navy being intended primarily as a defensive weapon, units of these other types were not best adapted to it. In other words, that we could defend our shores with dreadnaughts of heavy armor and armament and of moderate speed, aided by destroyers and submarines. But even granting that this be the case, it is an axiom of all military practice that the best defense lies in offensive operations. We, however, have built a fleet which, whatever its defensive powers may be, is much limited in offensive powers. We have no adequate means of attacking the commerce of an enemy, and what, perhaps, is equally serious, we have no adequate means of meeting or preventing depredations of enemy commerce destroyers, or the raids of high-powered battle cruisers. There is not on the Navy list of the United States to-day a single vessel, and probably no uniform group of vessels, that could have overtaken or destroyed the 'Emden.' Our battleships are all rated at two or three knots lower speed, while the combined batteries of the 'Birmingham,' 'Chester,' and 'Salem,' the only vessels rated at near her speed, though of somewhat heavier caliber and possibly longer range, would present but six 5-inch guns as against her ten 4-inch guns. Our so-called armored cruisers are all inferior to the 'Emden' in speed.

"Had we been fighting Germany, the 'Emden,' unless she had been caught in a trap, might have kept the seas indefinitely, or until we had time to build a vessel to meet her.

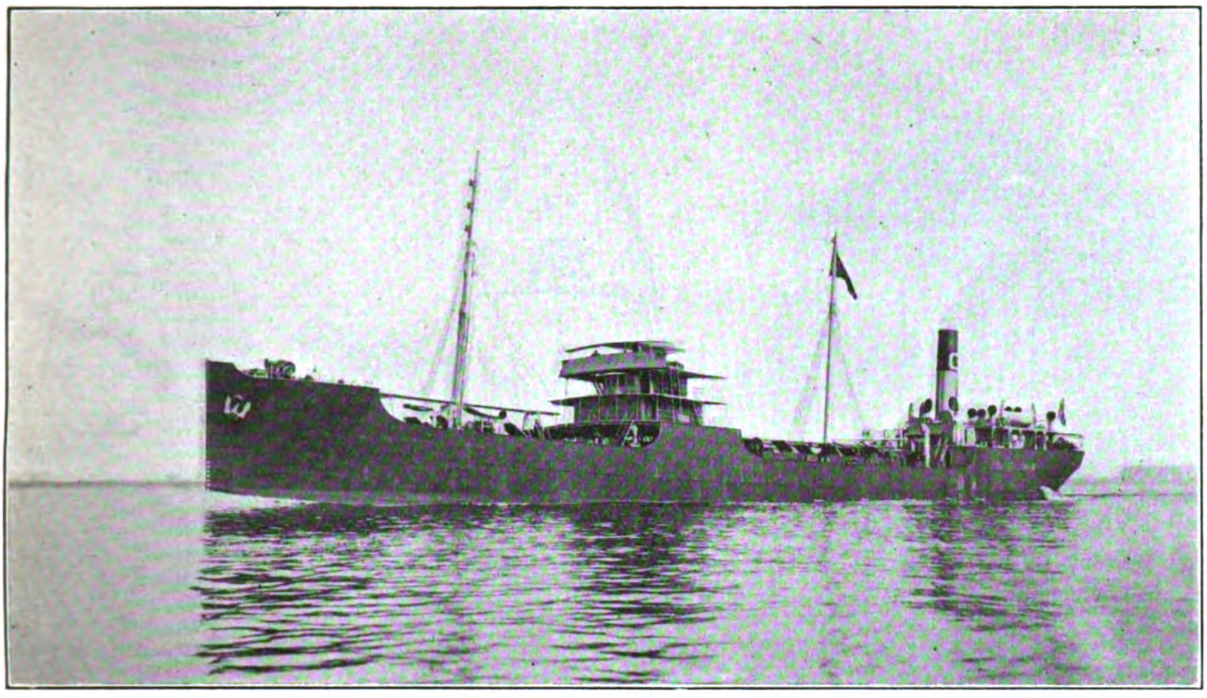
"So much for the commerce destroyer and scout cruiser. Now as to the fighting ship of the line. We have limited ourselves to battleships of heavy armor and battery power, but with a speed of from 20 to 21 knots. Our latest battleships are designed for speeds of 20.5 and 21 knots. Meantime all British battleships built since 1906 have a speed in excess of 21 knots. Of those building, the speed is designed to range from 22 to 25 knots, and British battle cruisers, practically equal to battleships in all but protective armor, have designed speeds ranging from 26 upwards to 30 knots. The German program includes battle cruisers in commission of 28 knots speed and upwards, and battle cruisers under design which are to make 27 knots. The Japanese and Russians have conformed to these same standards of speed.

"This situation, summed up, is that there is not in the Navy of the United States anything that would overtake and give successful action to the German battle cruiser fleet, to the British battle cruiser fleet, or, ship for ship, to the Japanese or Russian battle cruisers.

"These facts have got to be admitted. Never mind where the blame lies in the past; the blame to-day lies on him who attempts to conceal these facts, and on him who, being in authority and in a position to do so, does not immediately set about to correct them."

The contract for the fruit and fish warehouse at Seattle has been awarded by the Port Commission to Harrington & Peters, Seattle, for $111,000.

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The oil tanker "Gulflight" on trial in Delaware Bay.

Two Interesting Jobs

Two very interesting vessels built during 1914 were the "Gulflight" and the "Gulfstream," constructed for the Gulf Refining Company by the New York Shipbuilding Company. These handy tankers were delivered in remarkable time and were built during the same period that the Union Iron Works of San Francisco was making a speed record on even larger boats. The following data on the two eastern built boats is of interest:

	"Gulflight."	"Gulfstream."
Date of contract.....	Jan. 7, 1914	Jan. 7, 1914
Keel laid	Mar. 16, 1914	Apr. 4, 1914
Date of launching.....	Aug. 8, 1914	Sep. 17, 1914
Date of trial trip.....	Aug. 25, 1914	Oct. 2, 1914
Actual date of delivery...	Aug. 30, 1914	Oct. 9, 1914
Time consumed, days....	236	276

The "Gulflight" and "Gulfstream" are thorough, up-to-date tankers of the accepted type with machinery aft. In view of the rapid progress made on these vessels a brief description of hull and machinery is of interest. They are 391′ 7″ long between perpendiculars, 51′ 0″ beam and 30′ 2″ molded depth. The total deadweight is 7275 tons at 23′ 6″ draft. There are eight cargo tanks on each side with a fuel oil tank at each end with 200,000 gallons total capacity. The capacity for cargo oil in the main tanks is 2,140,000 gallons, and in the wing tanks 180,000 gallons. The hulls are built on the Isherwood system.

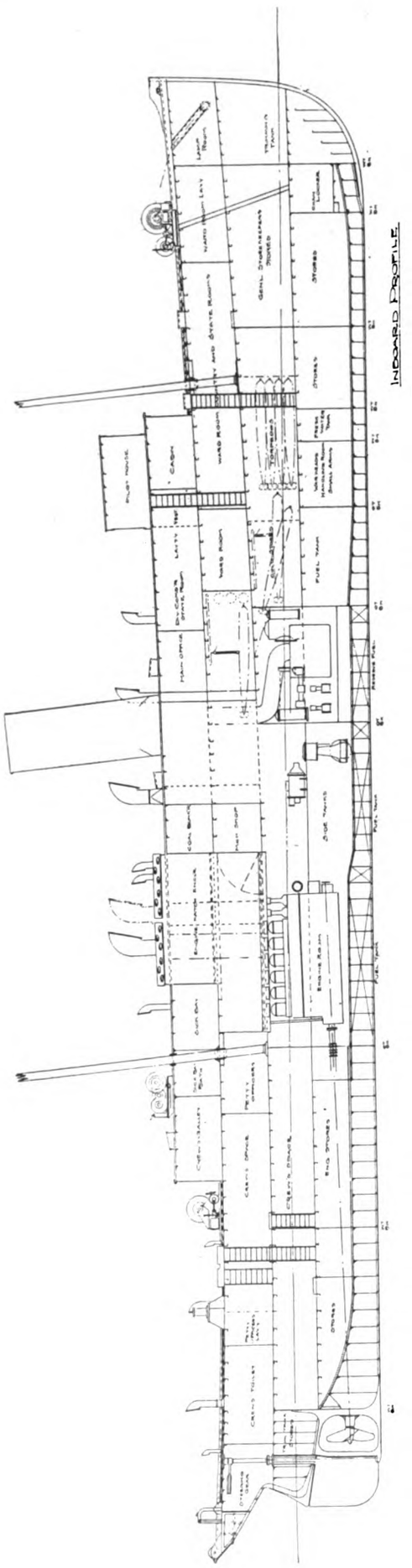
The engines are 27″, 45″ and 75″ cylinders by 48″ stroke, and steam is supplied by three Scotch boilers 14′ 8″ diameter by 11′ 0″ long, 3 furnaces each, working under Howden forced draft. The main pump rooms, located in port and starboard compartments, contain the following pumps: six oil pumps 10″ by 8½″ by 12″; one bilge pump 6″ by 5½″ by 7″, and one oil pump 12″ by 10″ by 12″. There is also a pump room forward containing one 6″ by 5½″ by 7″ vertical, direct fuel oil pump and one bilge pump of the same dimensions. A large air compressor was also fitted in the main pump room while the engine rooms were fitted with splendid and complete machine shops.

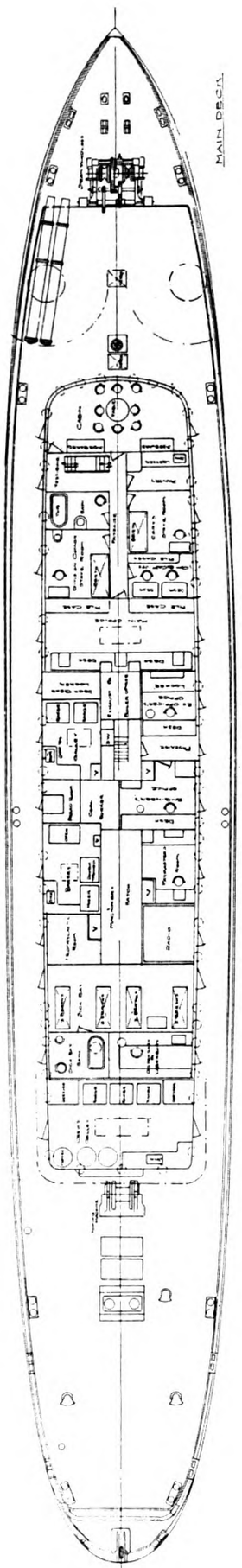
The quick delivery of these vessels, as well as others built in 1914, was largely made possible by the great dearth of merchant work in the large yards of the country.

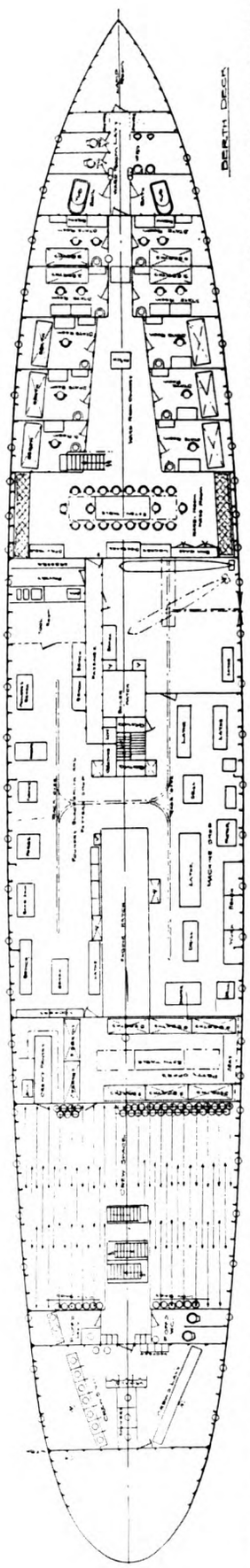
For the data given above and the accompanying photograph we are indebted to Mr. Dan E. Ford, naval architect, San Francisco.

A bill has been introduced in the House of Representatives at Washington, looking to the establishment of a Government line of steamers to engage in the Coast to Coast trade. $30,000,000 worth of tonnage is contemplated, and the fleet would be under the supervision of the Government-owned Panama Canal-owned railroad. Representatives and Senators are trying to have that $30,000,000 of Panama Canal bond money spent in a multitude of ways. The latest measure was introduced by Representative Stevens of California. We fail to see either necessity or reason in this bill.

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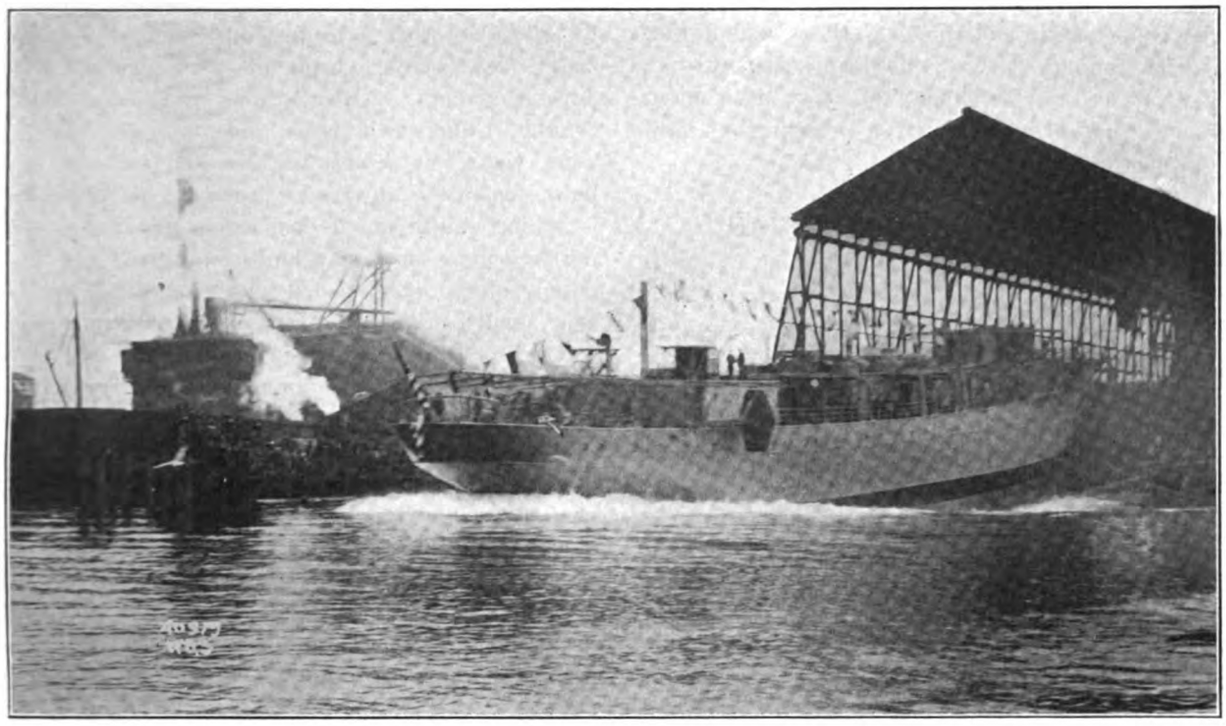






Plans of the Submarine Flotilla Tender "Fulton." This vessel differs from the "Bushnell" in that she is driven by Diesel Engines of the NLSECO type, while the "Bushnell" is driven by steam turbines. The "Fulton" was designed by Messrs. Cox & Stevens.

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The "Bushnell" took to the water without a hitch.

Launch of the "Bushnell"

ON February 9th the Seattle Construction and Dry Dock Company launched the submarine tender "Bushnell," the launching being an eminently successful one. The "Bushnell is a single screw steel vessel built to the highest rating in Lloyds. She has practically a complete double bottom and ten watertight transverse bulkheads extending to the main deck. The overall length of the new craft is 350′ 6″, length between perpendiculars 300′ 0″, beam molded 45′ 6″, depth molded 28′ 0″, draft 15′ 0″ mean at 3580 tons displacement, and a speed of fourteen knots is expected at the above draft. The vessel has three complete steel decks. The contract for her construction was let on June 30, 1913, and her cost is $935,695.

The "Bushnell" will be driven by Parsons turbines with designed shaft horsepower of 2500; arranged with four stages in low pressure, six stages in high pressure and four stages in the astern turbine. The turbines are connected to the shaft through reduction gearing. The turbines are designed for 2250 revolutions and the ratio of reduction in the gears is 1: 16.37. Steam is supplied by two Yarrow boilers, the steam pressure being 220 pounds. Forced draft under pressure not to exceed two inches of water is provided for. The fuel oil system consists of two Blake heavy pressure oil pumps; one Blake fuel oil booster pump and two Schutte-Koerting oil heaters. The burners and registers are of the special Navy Department type. The main surface condenser contains 3365 square feet of cooling surface and is fitted with Parsons augmentor and twin air pumps. The main air pump has single steam cylinders 12″ in diameter, with twin air cylinders 22″ in diameter and 15″ stroke. There is a 14″ centrifugal main circulating pump. The propeller is of manganese bronze with four blades, and is of the built up type with a diameter of 12′ 6″ and a pitch of 14′ 3″.

The electric generating outfit consists of two 300 K. W. generators connected by clutches to the turbine, and two 50 K. W. turbo generators. There is a complete cold storage and ice-making plant. There is a large air compressor for torpedo charging, air tools and boiler cleaning. The vessel carries wireless and also a submarine signaling apparatus supplied by the Submarine Signal Company of Boston, Mass. The "Bushnell" has a cable ship bow fitted with lifting gear which is worked by the anchor engine and is capable of lifting 60,000 pounds. The two steel masts are fitted with steel cargo booms and the deck machinery includes two General Electric Company's electric deck winches; a three-chain, spur-geared anchor windlass and a 14″ by 14″ towing engine.

While the question of offense is secondary with a craft of the "Bushnell" type, she carries four 5″-50 calibre rapid fire guns, one 18″ torpedo tube and two 6-pounder saluting guns.

All the living spaces below the main deck are provided with artificial ventilation and are heated by indirect radiation through the ventilation system. She is also completely fitted as a self supplying and sustaining repair ship with small, but efficient, black-

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smith, coppersmith and machine shops and a brass and iron foundry. Accommodations are provided for 19 officers and 300 men, the large accommodations for crew being required to house relief crews for submarine flotillas.

LAUNCH OF THE "BOSTONIAN."

On Tuesday, the 19th inst., Messrs. Harland & Wolff, Ltd., launched from their Glasgow yard the twin screw motor vessel "Bostonian" for the Leyland Line. The vessel is 414 feet in length over all and 52 feet beam, with a gross tonnage of about 6500.

The new vessel, which has been built to the highest class at Lloyd's and under the Board of Trade survey for Passenger Certificate, has been specially designed for the Atlantic trade. She has a double bottom fore and aft between the peak bulkheads, and three complete steel decks with bridges, and eight watertight bulkheads carried to the upper deck. There are six cargo holds each with a large hatch served by powerful derricks of 4, 6, 15 and 30 tons lifting capacity. The vessel will also have accommodations for a number of passengers.

The "Bostonian" will be fitted with Diesel oil engines. The advantages of internal combustion engines for marine purposes on the Diesel system have been demonstrated in a number of vessels already constructed, and the adoption of this principle by the Leyland Line will have a far-reaching effect in the development of British shipping and shipbuilding.

All deck machinery, including steering gear and windlass, will be electrically operated.

The vessel has been built under the supervision of Captain W. C. Fry, the owners' marine superintendent, and Mr. W. Scott, superintendent engineer, who was present at the launch.

AN ARMY COLLIER.

Referring to the United States army collier No. 1, recently launched at the yards of the Shanghai Dock & Engineering Company, the Marine Journal of New York makes the following comment:

The collier has a length over all of 362 feet, a beam of 50 feet, and a depth of 28 feet. It is fitted with four coal-bunkering elevators, coal chutes, and weighing machines, the last-named device being automatic in type. There is an elevating coal conveyor capable of discharging at a height of 50 feet above deep-load water line of the collier. The total carrying capacity of the vessel is about 6,000 tons.

There is no doubt of the Army's need of such a vessel and perhaps more of the same character, as there is not an army transport out of the entire fleet of seventeen that is sufficiently stanch to carry a heavy dead-weight cargo in consequence of their advanced years. Already it is announced that the "Crook," thirty-two years old, and the "Meade," eight years her senior, will be sold as soon as the permission of Congress is given. The Government is taking unwarranted chances in sending some of the transports now in commission across the Pacific or any other ocean loaded with troops. Were these ships owned by private parties their owners would be refused certificates of inspection to engage in passenger traffic by one branch of its service, and rightly, too, as they have outlived their usefulness.

Why this new collier was built in Shanghai has not been publicly explained. With American workmen and shipyards seeking such work, explanation is certainly due, especially when the unanimous wish of every native-born citizen is that everything afloat or ashore in the United States should be labeled "Made in America." Building this new army collier in China therefore reminds us of Edward Everett Hale's "Man Without a Country," for while she will fly the American flag, that will be the only patriotic thing about her constructon and outfit.

"CHICKAMAUGA" LAUNCHED.

The Pacific Towboat Company's new tug "Chickamauga" was launched February 10th from the Nilson & Kelez yards in the East Waterway, Seattle, in the presence of a large crowd of spectators.

Miss Ruth Studdert, twelve-year-old daughter of Hugh S. Studdert, the port engineer for the company, acted as sponsor for the vessel, smashing the bottle of champagne against the vessel's bows with a wallop.

The "Chickamauga" is the first Diesel-powered tug in America and the most heavily engined motor tug on the Pacific Coast, and represents an investment of $25,000.

Motive power will be furnished by a four-cylinder, 240 horse-power Nlseco engine, with a fuel consumption of twelve gallons of oil an hour.

Aside from her engine she will be equipped with two new pieces of mechanism, the invention of Port Engineer Studdert. One is a towing machine, consisting of a steel drum, geared off the engine, and the other consists of equipment for lowering and raising the anchor, which is also geared off the engine. By the installation of the Studdert inventions, the Diesel engine will do all the power work aboard the vessel, making it unnecessary to have additional engines for the towing machine and anchor equipment.

The "Chickamauga" was designed by L. E. Geary, naval architect, Seattle. She is 70 feet long, 18 feet beam and 10 feet in depth.

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The Motor Ship "Pacific" in Culebra Cut. This picture gives an excellent idea of the problems caused throughout this section of the canal by frequent heavy slides.

The "Pacific" in the Canal

THE accompanying photograph shows the motor ship "Pacific" passing through Cucunacha Slide, Culebra Cut, on January 19th at three o'clock in the afternoon. For the use of this beautiful picture we are indebted to W. R. Grace & Company, the Pacific Coast representatives of the North Star Company of Stockholm, operating the "Pacific" and her sister motor ships.

The "Pacific" is the latest motor ship to visit San Francisco having held her builders' trials on Copenhagen Sound on December 12, 1914. The "Pacific" is 362′ 0″ between perpendiculars, 51′ 3″ beam and 20′ 1″ draft. The propelling machinery consists of two sets of six-cylinder, four-cycle Diesels designed to develop 1000 horsepower each under normal working conditions. The cylinders are approximately 21¼″ in diameter by 28¾″ stroke. The guaranteed speed on trial was 10¾ knots and 11.41 knots was obtained with the engines giving 2032.5 horsepower at 152.5 revolutions. Including auxiliaries the fuel consumption on trial was 680 pounds of fuel oil per hour or

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.335 pounds per indicated horsepower. The "Pacific" is Burmeister & Wain's fifth sister motor ship for the North Star Company of Stockholm, the first two, however, were equipped with eight-cylinder 1000 horsepower engines, while the three later are engined with six-cylinder units of the same power. One of the remarkable things about the latter three ships is the remarkable closeness of their trial performances, the fuel consumption being .339, .335 and .335 pounds per horsepower hour.

Practically all the auxiliaries on board the "Pacific" are electrically driven, there being two large Diesel driven auxiliary dynamo sets developing current at 220 volts. There are 14 electric cargo winches and the steering gear is of the Hele-Shaw electric hydraulic type. All the engine room pumps are electrically driven.

The Ship Purchase Bill

WITHOUT amendments the Ship Purchase Bill, over which there has been and will continue to be a great amount of debate and conjecture, carries the following provisions:

Organization.

A private shipping corporation with a capital stock of $10,000,000, fifty-one per cent. of which is to be subscribed by the Government and the remainder offered to public subscription.

Control.

The control of this corporation would be vested in a Shipping Board consisting of the Secretary of the Treasury, the Postmaster General and the Secretary of Commerce. This Board would have voting power over the Government stock and general supervision of the corporation's activities.

Restrictions.

The corporation may operate its vessels only in trade with foreign countries or with the Philippine Islands, the Hawaiian Islands, Guam or Tutuila.

Government Purchase.

The Federal Government itself is authorized to purchase or construct merchant vessels, using therefor not to exceed $30,000,000 derived from the sale of Panama Canal bonds and transferring the vessels to the Shipping Corporation in return for the corporation's 4% first-mortgage gold bonds. These bonds may be sold by the United States in order to reimburse itself for expenditures in buying and constructing vessels for the shipping corporation.

Type of Ship.

The ships purchased or built, as far as commercial requirements permit, to be of a type suitable for use as auxiliaries of the United States Navy.

Auxiliaries.

Authorization is given for the transfer of the ships of the Panama Railroad Company to the new corporation and also any vessels belonging to the War or Naval establishments that may be suitable for commercial purposes and are not required by the Army or Navy in times of peace. Upon notification, the President may take for use as naval auxiliaries any vessels in possession of the corporation, a reasonable compensation being given. In case of emergency he may take possession without notice.

Beginning of Business.

This will be as soon as 51% of the stock is subscribed and paid for by the United States Government.

The organization of the Shipping Corporation as outlined above insures its direct control by the Government and leaves no doubt as to the nature of the undertaking.

The controlling board, consisting of three members of the Cabinet, is a peculiar one. There is no reason why the Postmaster General or the Secretary of the Treasury should know anything about shipping matters. Four years is a short apprenticeship in which to master an intricate business and the Cabinet officers are apt to change once every four years if not oftener. The Secretary of Commerce might be expected to know a little something concerning marine matters, but it is not necessary that he does and it is doubtful if that office ever will be filled by anyone trained in the operation of steamships. As far as management is concerned or even supervision there is every reason why the board as provided should prove a failure.

As to the restrictions limiting the field of operation for the new Government corporation, these will probably be abrogated as indeed an amendment to include the coastwise trade as a field for Government activities has already been introduced. In this connection, perhaps, it would be foolish for the Government to overlook such an opportunity for a monopoly as would exist with the Federal Alaska Railroads' terminals hitched up to a Government line of steamers. If the Government could not make that combination pay, it would realize that the Government ownership idea was impracticable.

As to the Government purchase scheme, the Administration appears to be playing safe. It is to reimburse itself by selling the shipping corporation's bonds. Depreciation could be omitted on the fleet

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and some future administration could take care of the mess.

As to the utility of the corporation's fleet as naval auxiliaries it will be almost impossible to preserve this quality to any great extent if the vessels are purchased. A specially-built fleet would, of course, be much more susceptible to efficient use as auxiliaries.

The ships of the Panama Railroad will be a doubtful acquisition for the corporation. They have not paid in Government service yet and they are getting older every day. As to the commandeering of vessels in the case of necessity, this is possible with any vessel flying the American flag whether the Government has an interest in her ownership or not.

The Government is not going to wait until the public gobbles up the 49% of the stock offered for sale, but will start into business immediately. From this it would appear that the Administration has some doubts as to the attitude of the public towards the new venture as an investment.

FREIGHT REPORT.

San Francisco, Feb. 19th, 1915.

Since our review of the 20th of January, highest records have been made, especially so, on the Atlantic side of the United States, as well as in coal freights from England to the Mediterranean, and in grain freights from Buenos Ayres.

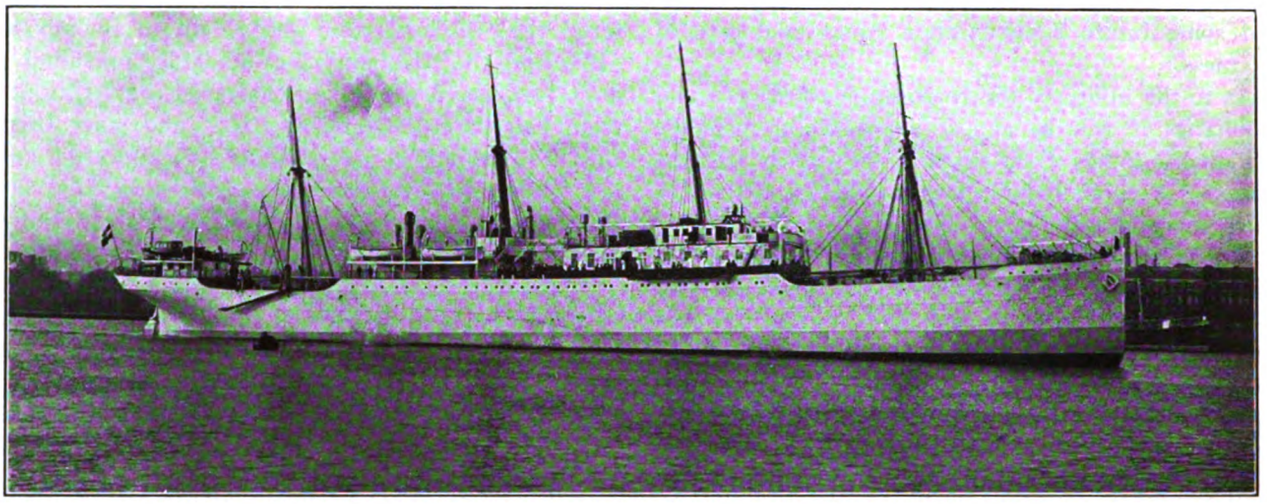
Now to our Coast. On the 22nd of January, Kerr, Gifford & Co. chartered the "Luceric" and the "Batsford" at 52/6, and a few days afterwards, the steamer "Kish" at 55/— for wheat to United Kingdom, and on the 4th of February, Balfour, Guthrie & Co. chartered the Japanese steamer "Kenkon Maru" at 60/— with the option of merchandise, and two days later, Kerr, Gifford & Co. again lifted the market paying 65/— for the steamer "Lowther Castle" for wheat from Portland to United Kingdom. In the sailers, the only charter made was that of the "Port Stanley," chartered by Hind, Rolph & Co. to load wheat in Portland at 55/— which is also a sensational price, though on the day of her arrival at Astoria, the charterers refused a firm offer of 57/6 for her, preferring to load a cargo of wheat for their account, unless they could get 60/—.

From San Francisco, we have only two charters to report, Strauss & Co. having taken the "Ville de Mulhouse" at 40/—for barley, and Hind, Rolph having rechartered the "Macmahon" at 43/— from G. W. McNear & Co. No doubt, more steamers could have been fixed for barley from here to U. K., but excessively high bids from Portland precluded our getting any steamers at the rates we could afford to pay from here. Our coasting tonnage is now beginning to feel the influence of the high freights. Hind, Rolph & Co. have chartered the "Alvina" from the North to Sydney at 51/3, and the "Kohala" for Adelaide, presumably at 60/—. Davies & Fehon chartered the "Antiope" from Eureka to Sydney at 50/—, and since then, the "Philippine," "Samoa" and "Commerce" and the "Alumna" are reported chartered at 52/6 per thousand, to load at the Northern ports for Sydney. Hind, Rolph & Co. have chartered the "William T. Lewis" from the north to a direct port U. K. at 100/—. The "Tasmania" is also reported in the same direction at 87/6, but evidently this charter was made some time ago. We are now bidding 52/6 for Sydney, 60/— Melbourne and Adelaide. and 100/— for direct port on the West Coast of U. K. to load any time from the 1st of March to the 1st of June, but vessels are now asking 55/— for Sydney and 62/6 for Adelaide, and all the way from 110/— to 120/— for lumber to U. K. as above, and in our opinion, they will soon get these rates.

Time charters have not been many, again owing to scarcity of steamers. The steamers "Stanley Dollar" and "Olson & Mahony" were both chartered about the 1st of February by the American Hawaiian S. S. Co. to, in part, fill vacuum on account of the loss of their steamer "Washingtonian" and the laying up for repairs of their steamer "Isthmian" at $225.00 per day, Time Charter, for a round trip to New York and return. The rates previously paid for such business was $175 per day. The steamer "General Hubbard" was chartered at $300 per day, Government-form, by Sudden & Christenson, delivery and redelivery San Francisco, for three to nine months, vessel giving the privilege of trading in the Atlantic to Europe, charterers as usual, paying the extra marine insurance on the hull, and the war risk insurance as well. The same firm have also chartered the steamer "Thor" for delivery and redelivery on this Coast. She is reported to be engaged to carry lumber to Quebec, and charterers have already engaged a coal freight back from Norfolk, Virginia, to San Francisco for the United States Government at $7.00 per ton. The steam schooner "Cricket" has been chartered by a northern lumber mill to carry lumber from Puget Sound to New York at $12.00 per thousand, and Comyn, Mackall & Co. have chartered the Japanese steamer "Senju Maru" for delivery and redelivery Japan, six to nine months, at 6/— on the dead weight. They have the option of sending her through the Canal to Europe. Steamers "Isthmian," "Pennsylvanian" and "Henry Ibsen" are all reported chartered to go down to Chile to load nitrate, thence to the Gulf of Mexico or Atlantic ports, U. S. A., at 50/— per ton. Taking one consideration with another, we still feel bullish on the situation.

PAGE BROTHERS.

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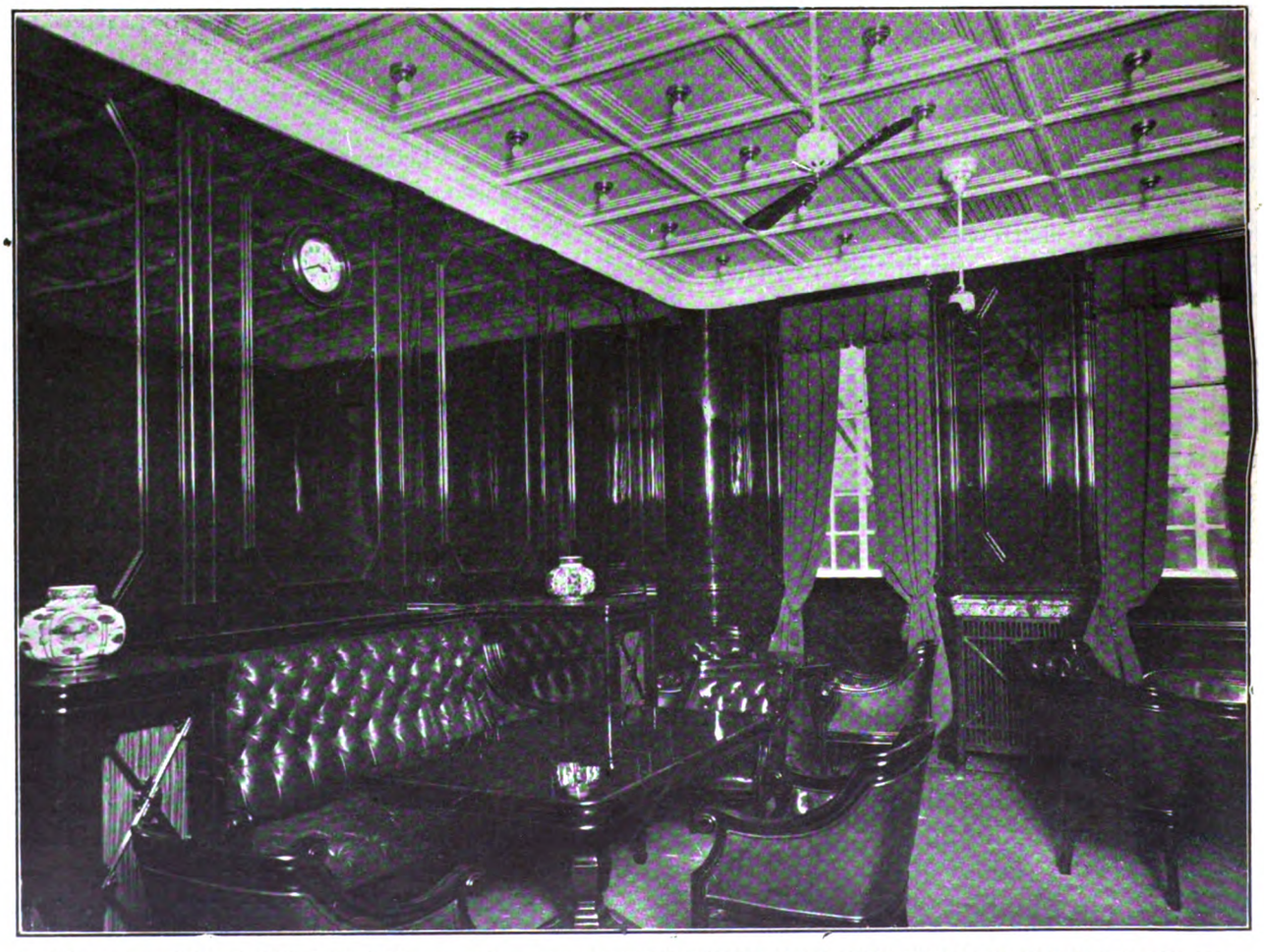


M. S. "Fionia"—Motor ships are now becoming very familiar objects in San Francisco Bay.

Motor Ships Now Numerous

SAN FRANCISCO has now become quite used to the presence of motor ships in her harbor, but nevertheless the recent visit of the "Fionia" of the East Asiatic Company's fleet has renewed interest in a class of vessels that is persistently and steadily coming to the fore. The "Fionia," however, would have been an object of interest and admiration if she were not a motor ship, as the local agent of the East Asiatic Company, Mr. Otto Jelstrup, has every reason to take pride in showing visitors through other parts of the vessel as well as her engine room.

The "Fionia" was delivered to her owners by Burmeister & Wain a litle over one year ago and has since been actively and continuously in service. She

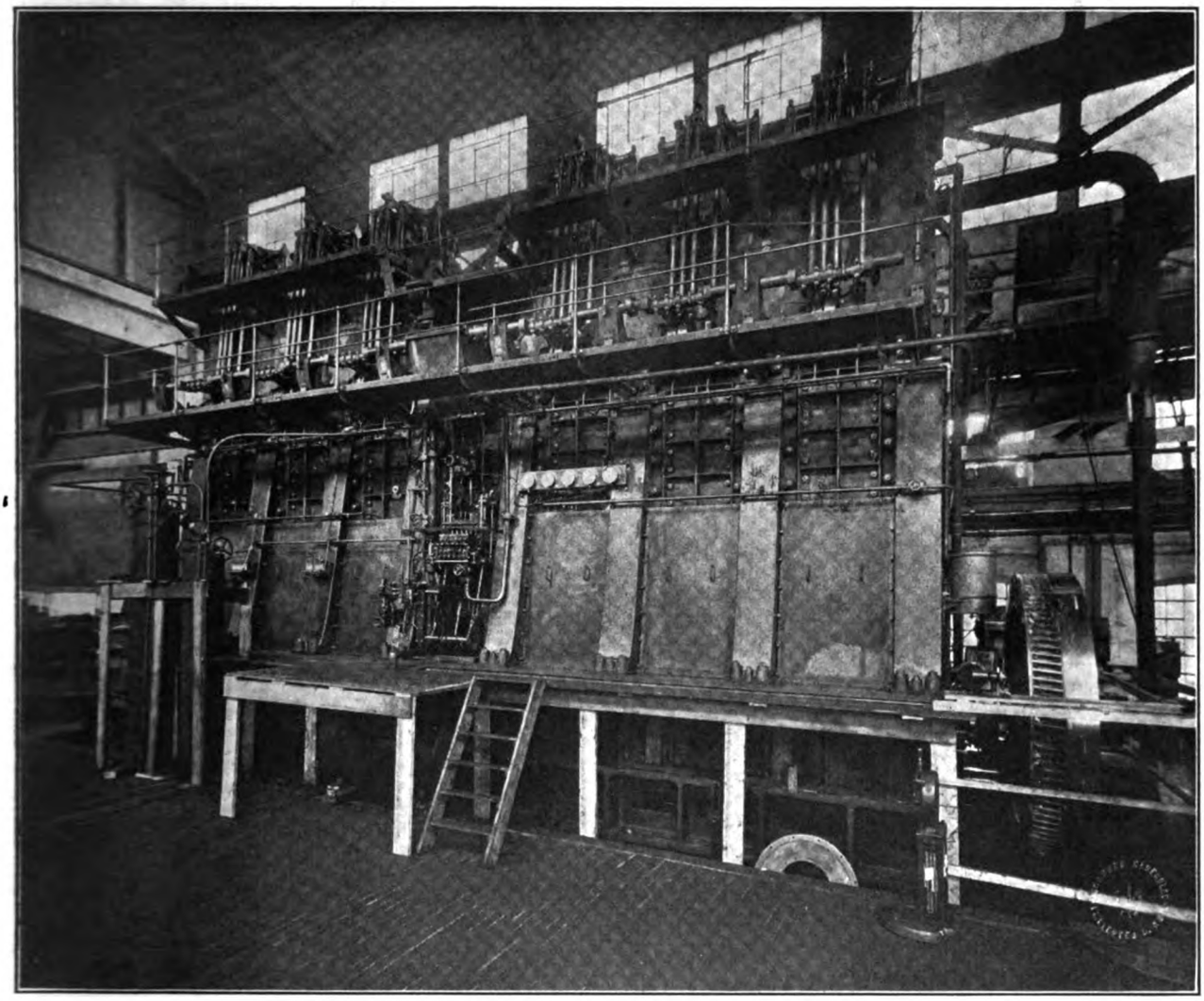


Smoking room of M. S. "Fionia." This vessel has very beautiful quarters for a small number of first-class passengers.

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has a length of 410′ 0″ over all, 395′ 0″ between perpendiculars, 53′ 0″ beam and 38′ 0″ molded depth, and a deadweight capacity, including bunkers, of 7000 tons. The passenger accommodations are arranged amidships and are specially fine and commodious. The state rooms, smoking room and dining room are all finished in hardwood and handsomely furnished. Nearly all rooms have bedsteads and private baths attached.

The auxiliary machinery is all electrically operated, there being 12 three and one-half ton electric winches, and an electrically driven steering gear and windlass.



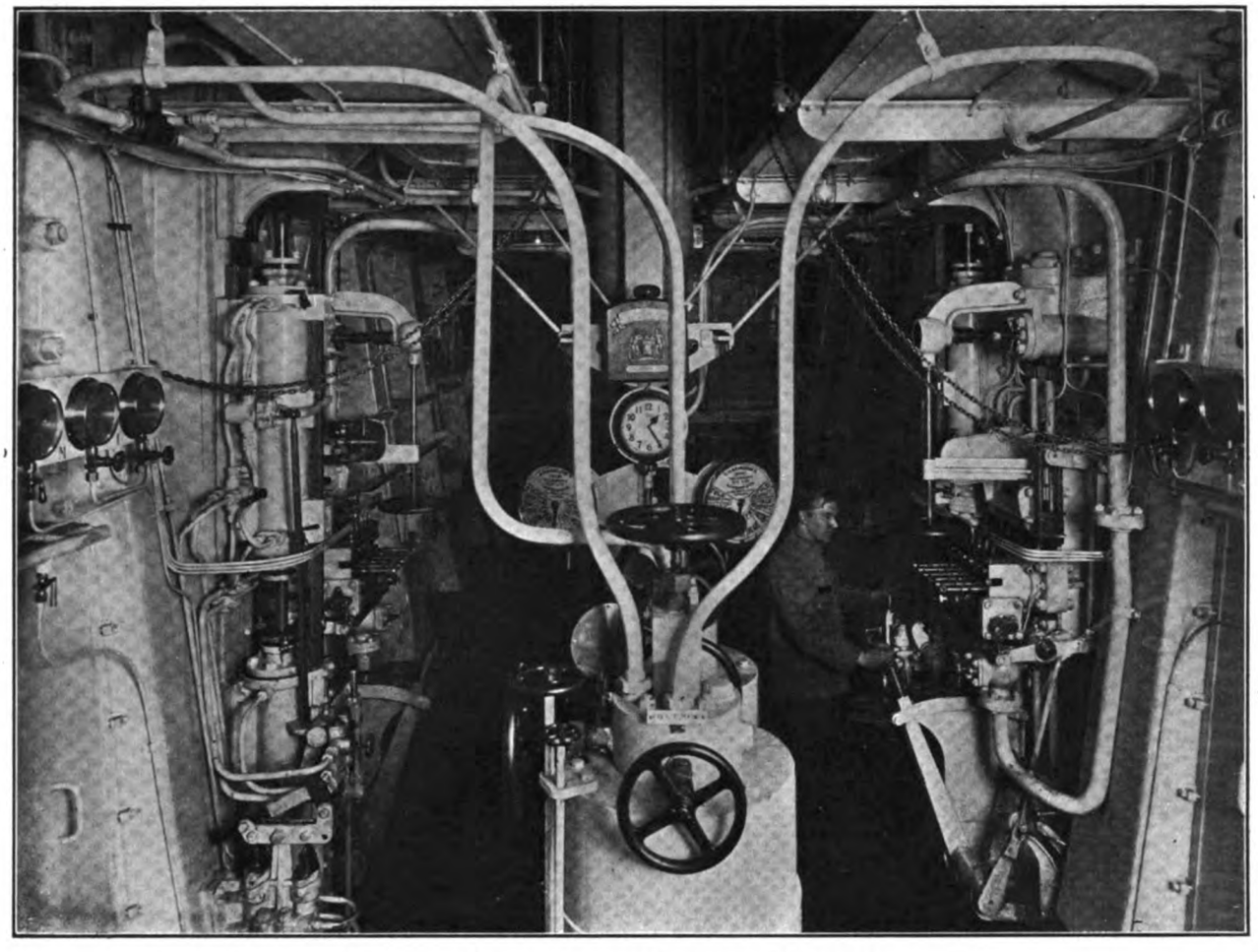
The engines of the motor ship "Fionia" in the erecting shop of Messrs. Burmeister & Wain.

The vessel is, of course, fitted with wireless and there is a large refrigerating plant. While these auxiliaries are all capable, well designed units, it is, of course, the engine room where the geratest interest is found for the marine engineer.

The main propelling machinery of the "Fionia" consists of two four-stroke Diesel engines with six cylinders 29.13″ in diameter and a common stroke of 43.3″. At 100 revolutions these engines develop 2000 i.h.p. each. In the construction of these engines Burmeister & Wain departed from their former eight-cylinder practice. The bed plate is cast as if for an ordinary steam engine with open crank pits below which are welded steel plates acting as an oil reservoir. The whole front of the engine framing as well as a part of the back is open below the line of the crosshead guides, making an extremely accessible arrangement. The openings are closed by air tight steel plates, made easily removable, thus enclosing all moving parts and facilitating forced lubrication.

The cylinder jackets are cast in two groups, each with three cylinders. The cylinders are accessible from below, an advantage not enjoyed in former motors, and the further advantage is obtained that the cylinder oil in dripping down does not mix with the lubricating oil. The crank shafts are built up and are bored for admission of oil for forced lubrication. Connecting rods, piston rods and crossheads are all of the ordinary marine type. The pistons are water cooled with sea water. The water is carried to and from the pistons by means of telescopic pipes fitted with metallic packing. The change in this installation from the former method of oil cooling pistons was occasioned by the difficulty in cooling a large

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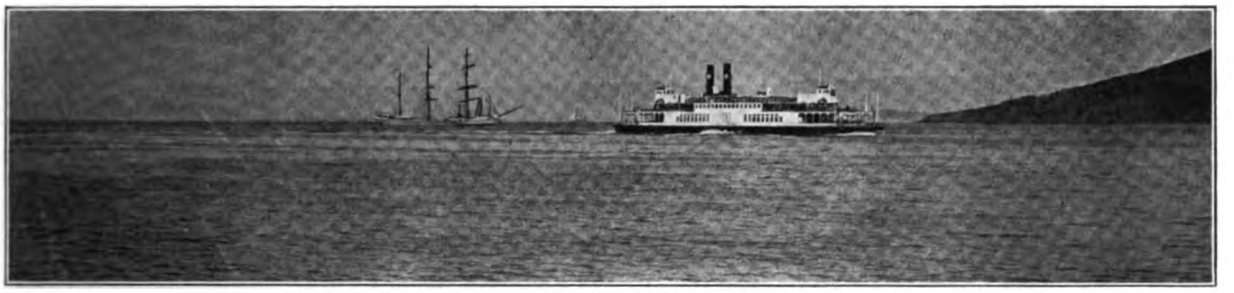
Starting platform in the engine room of the "Fionia."

enough quantity of oil to answer the purpose. The valve motion is of the usual Burmeister & Wain type and the reversing is accomplished by a reversing machine similar to the Brown gear, which is driven by the maneuvering air and has given great satisfaction. The cam shaft is not driven, as usual, by connecting rods, but by two large geared wheels. The fuel pumps, of which there is one for each cylinder, are driven by levers from one of the intermediate shafts of the cam shaft gear.

The compressors for the injection of air are driven directly from the end of the main engine shafts. This was a radical departure from Burmeister & Wain's former motor ship practice, which was to have compressors driven from the auxiliary motors. In the case of the "Fionia," with her 4000 horsepower, it would have been necessary to increase the auxiliary motors to 300 horsepower to enable them to handle the compressors, and such auxiliaries were not required for the deck machinery.

The main engines are started by air at 25 atmospheres, which is stored in two air flasks with a volume of 800 cubic feet each. This air can be taken from the compressors on the main engines, but during maneuvers is taken from an auxiliary compressor. This compressor is driven by a 200 horsepower electric motor and is capable of serving as a spare for one of the compressors on the main engines. For operating this compressor and for the production of electricity for lighting, steering gear, winches, etc., two four-stroke Diesel engines of 200 horsepower at 225 revolutions are installed. These motors are directly coupled to continuous current dynamos working at 220 volts, this being cut down to 110 on the lighting system. The following engine room auxiliaries are electrically driven: Two centrifugal cooling water pumps with vertical shafts; two sets of pumps for forced lubrication; two sets of bilge, sanitary and piston cooling pumps of the plunger type and driven from the same crank shaft. There is one ballast pump, one fire pump, one fresh water pump, one fuel oil pump, one refrigerating machine and one small crude-oil motor for lighting the ship when in port, the latter also operates a small compressor used to charge the flasks for starting the main engines. On the engine room casing are arranged two daily supply tanks, each having a capacity for twelve hours' supply when the engines are working under full load. These tanks are pumped up alternately so that the supply of fuel oil has time to settle and precipitate water and foreign matter before being used in the motors.

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Pacific Coast Shipping Notes

SEATTLE.

Among the interesting jobs just completed by the Seattle Construction & Dry Dock Company was the fitting of fifty-eight steel state rooms on the Puget Sound Navigation Company's steamer "Chippewa." The steel deck house replaced the old wooden structure and the fireproofing idea was carried out faithfully. The vessel will be placed on the Seattle, Port Townsend, Port Angeles route.

The three big Government tugs "Mohave," "Arapahoe" and "Tillamook," recently finished by the Seattle Construction & Dry Dock Company have been undergoing Government speed tests. The "Arapahoe" and the "Tillamook" are to be transferred to service at Mare Island Navy Yard.

W. H. H. Wood, one of the most widely known transportation men in Seattle, for the past three years chief clerk in the office of Assistant General Freight Agent R. D. Pinneo of the Pacific Coast Steamship Company, has resigned his position to take up other work.

The British cable ship "Restorer" has had new topmasts fitted at the Seattle Construction & Dry Dock Company's plant. The vessel lost her topmasts during a heavy gale on the Sound.

According to Secretary Clay M. Strong, the Bellingham-Alaska Trade & Transportation Company will begin the construction of a new steamer some time during the present month. The new craft will be used on a route which will include the newly opened Kuskokwim River entrance. The steamer will have a deadweight capacity of 1200 tons and be fitted with accommodations for one hundred passengers. The vessel, costing in the neighborhood of $150,000, will be constructed by the Kirby Shipyard of Bellingham, and will be completed in time to arrive off the Kuskokwim River by June 1.

The Canadian Trading Company, Limited, with Walter R. Dockrill of Vancouver as President and Claude M. Pettibone of Seattle as Vice-President was recently organized with the purpose of entering the export lumber trade and general cargo business. The new concern has chartered the British schooner "Albert Meyer" for March loading in British Columbia for New Zealand and Australian ports and the British schooner "Coquitlam City" for April loading for the same route.

The following from "Commerce Reports" illustrates the value of steamship connections better than reams of argument could do: "The Volunteer fleet recently established between Puget Sound and Vladivostok is bearing fruit in the foreign trade. A letter from the Imperial Russian consul to the Seattle Chamber of Commerce contains the following statements:

"'It gives me pleasure to inform you that an order for 15,000 railway cars has been placed by our Government with a Seattle company.

"'I hardly need emphasize the importance of such a step to the port of Seattle and to the future relations between this Sound and our Far Eastern possessions through the agency of the Volunteer fleet.'"

The latest Royal Mail Steam Packet steamer to arrive at Seattle was the "Glengyle," on February 17, the vessel being on her maiden voyage. In appearance the "Glengyle" resembles the "Carnarvonshire" and the "Cardiganshire," but she is of somewhat greater deadweight capacity.

Fearing that the products of the fresh and frozen fish industry of Puget Sound will be diverted from Seattle and the American railroads to Prince Rupert and the Grand Trunk Lines, a delegation of prominent Northwest residents have been in Washington urging that remedial steps be taken. The delegation included Judge Thomas Burke, President of the Seattle Chamber of Commerce; Traffic Manager R. M. Calkins of the Milwaukee and St. Paul railroad; James G. Woodworth, vice-president and traffic manager of the Northern Pacific Railroad; John Carrol, attorney for the Great Northern Railroad; Edward Cunningham of Seattle, a fishing fleet owner; Miller Freeman, publisher of the "Pacific Fisherman," and Fremont King, manager of the Tundra Trading Company.

Frank R. Hanlon, traffic manager for the Port of Seattle since last summer, turned over that office to Assistant Secretary Hamilton Higday of the Port Commission on January 30th.

Balfour and Guthrie, Seattle agents for the Harrison Direct Line and numerous other shipping in-

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terests, have moved their headquarters from the Central building to the new Stuart building at the corner of Fourth avenue and University street.

Under lease from the Northern Pacific Railroad Company, the Dodwell Dock and Warehouse Company have taken over pier 4 as a terminal for the Border Line Transportation Company's fleet. This will relieve the congestion at pier 14, the terminal of the Blue Funnel Line. George A. Heyburn, superintendent of pier 14, will also have charge of pier 4.

R. J. Ringwood, general manager of the Pacific-Alaska Navigation Company, has made the following changes in the disposition of the company's freight and passenger agents:

S. B. Stocking, contracting freight and passenger agent in Seattle, is promoted to the office of agent in Tacoma, with headquarters in the Perkins building. He succeeds J. W. Russell, who has been assigned to other duties. Stocking's place in Seattle is taken by George J. McCarthy, who has been agent at Juneau. Hugh Gallagher, agent at Skagway, succeeds McCarthy at Juneau, the Skagway office being temporarily closed. B. F. Watson, assistant general freight and passenger agent, who has made his headquarters in Seattle since early last year, hereafter will make his headquarters in Seward, Alaska. In line with the same policy, M. F. Cropley, former commercial agent in San Francisco, was made general agent in that port at the first of the year, the promotion giving him full charge of the company's operating and traffic business in San Francisco.

Puget Sound's first Diesel engined tow boat is now nearing completion at the yards of her builders, Nilson & Kelez. The new craft, which is 75 feet long, 18 feet beam and 10 feet deep, will be equipped with 340 horsepower Diesel engines. The hull was designed by L. E. Geary, naval architect.

On February 6, the new lighthouse tender "Fern" was launched at the yards of her builders, the Hall Brothers of Winslow. The "Fern" is a single screw, wood hull, oil burning vessel with an overall length of 112 feet, 22 feet beam and a molded depth of 10′ 3½″. She will be driven by a 300 horsepower triple expansion engine built by the Heffernan Engine Works of Seattle. The vessel is designed for a normal draft of eight feet on 225 tons displacement.

VANCOUVER.

The resumption of the Grand Trunk Pacific Steamship Company's bi-weekly service between Victoria, Seattle, Vancouver and Prince Rupert is being planned for about April 1st. The steamers "Prince George" and "Prince Rupert" are being overhauled and repainted for this summer service.

Messrs. Yarrow Limited of Esquimalt report an average month of ship repair work during February, their dock being fairly well occupied during the entire month.

The Vancouver pilot authorities at their recent annual meeting decided upon certain recommendations in regard to the pilotage situation at that port. These recommendations have been forwarded to Ottawa where they must be approved before going into effect. It is understood that the local authorities have recommended a reduction in the compulsory pilotage charges for Vancouver, Howe Sound and Powell River. It is not proposed to make any alteration in the non-compulsory pilotage charges, or what is commonly known as gulf pilotage. An effort is also made to adjust pilotage rates from Puget Sound.

TACOMA.

Mr. W. E. Dow, formerly Secretary of the Mercantile Marine Association of New York, has secured an interest in the A. W. Thornley Company, custom-house brokers. This firm has moved its headquarters to the Perkins' Building and are the local agents of Frank P. Dow & Company of Seattle.

The recent visit of the steamer "General y Pasquiera" marked the first appearance of the Mexican flag in Tacoma harbor for many years. The owner of the steamer is the American-Mexican Steamship Company, an organization formerly known as the Compania Naviera del Pacifico.

PORTLAND.

The opening of the Dalles-Celilo canal, which is scheduled for about May 1st, will be marked by important improvements in the river steamboat service out of Portland. The Dalles-Columbia Line, backed by the Willamette and Columbia Towing Company, is planning to have a boat leave Portland every evening at eleven o'clock for Pasco, the stern wheelers "J. N. Teal," "Inland Empire" and "Twin Cities" being assigned to this route. The steamer "State of Washington" will operate on a daily round-trip schedule between Portland and the Dalles. The "Vulcan" will run between Pasco and Lewiston, covering the Snake river, and the steamer "Relief" is to ply between Pasco and White Bluff. The Dalles, Portland and Astoria Navigation Company will continue to operate the "Dalles City" and the "Bailey Gatzert." The "Tahome," of the People's Transportation Company, will also be in evidence, so that the steamboat service on the middle Columbia for the present year will be well taken care of.

Bids are now receivable for the construction of the "Woodland," which is to serve as a tender for the Army suction dredge "Monticello," building at the Willamette Iron and Steel Works. The "Woodland" will be 97 feet long, 20 feet beam and four feet depth of hold, and is intended for light draft work on the Clatskanie, Cowlitz and Lewis rivers.

The Port of Vancouver on the Columbia river is

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The above two interesting views show graphically the extent of work on the Grace steamer "Santa Catalina," which was badly damaged by fire on the Columbia River. Her repairs were completed in very fast time by the Willamette Iron and Steel Works of Portland, Oregon.

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rushing work on its new jetty and already over four hundred feet of the proposed 1800-foot structure is completed.

It is expected that the new Pilot Commission will be appointed by the Governor within a very short time. There are three Commissioners to be appointed and five applicants, Frank Hagermann, a former Pilot Commissioner of Portland, and E. W. Tallent, S. M. Gallagher, Fred Warren and Captain C. S. Gunderson, all of Astoria.

Bids for the construction of the hull for the new U. S. snagboat "Mathoma" were opened at the local Government engineer's office on January 27. The new boat will be 140′ 0″ long, 34′ 0″ beam and 4′ 0″ deep and constructed of wood. The contract includes the removal of a deck house and machinery from an old boat to the new hull. The bids received were as follows: St. Helens Shipbuilding Company, St. Helens, Oregon, $8870; Joseph Supple of Portland, $12,750; St. Johns Shipbuilding Company, St. Johns, $9375; Portland Shipyards, $9485, and Wilson Brothers of Astoria, $14,946.

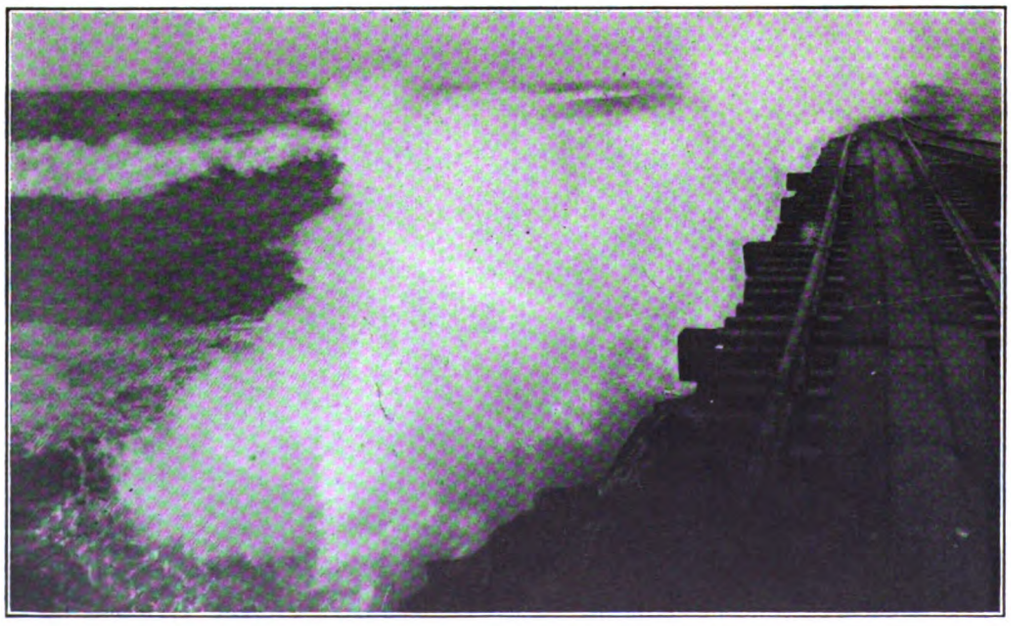
The Columbia river lightship "No. 50" was sold on February 16th. This vessel has had an interesting and honorable career and her steel frame, wood planked, copper sheathed hull has withstood many vicissitudes. She was built at the Union Iron Works in 1891 and in May, 1892, took up her Columbia river station. In November, 1899, she parted from her moorings in a great storm and was eventually beached near McKenzie Head. She pounded on the beach a few months and was then hauled overland to Baker's bay and towed to Portland for repairs. In October, 1906, "No. 50" again broke her moorings and went on Peacock Spit, where she remained for two weeks. In May, 1907, she again went adrift, but was picked up before going aground. For the past four years the vessel has been laid up.

It is currently reported about Portland that San Francisco parties have been making overtures with a view of obtaining the Columbia river steamers "Bailey Gatzert" and "Dalles City" for use on San Francisco Bay during the exposition. The Interstate Commerce Commission will probably hold that the North Bank Railroad interests can not operate these two vessels to Washington points as the route parallels the rail line. The "Gatzert" has been out of commission since last Fall and the "Dalles City" is laid up on account of ice in the river and these facts have materially aided the rumors that the boats were to be disposed of.

The Willamette Iron and Steel Works has been very busy during the past few months, interest centering of course in their large repair job on the "Santa Catalina." This work, the largest marine repair job yet undertaken in Portland, has been a source of much gratification both to the contractors and the owners. There had been a general belief on the coast that really high class ship joiner work could not be turned out at Portland, but the class of ship carpentry put in on the "Santa Catalina" effectually silences this rumor. Mr. Mathieson, who is looking after the repairs on the Grace boat, has declared the new teak pilot house as fine a bit of joiner work as he has ever seen.

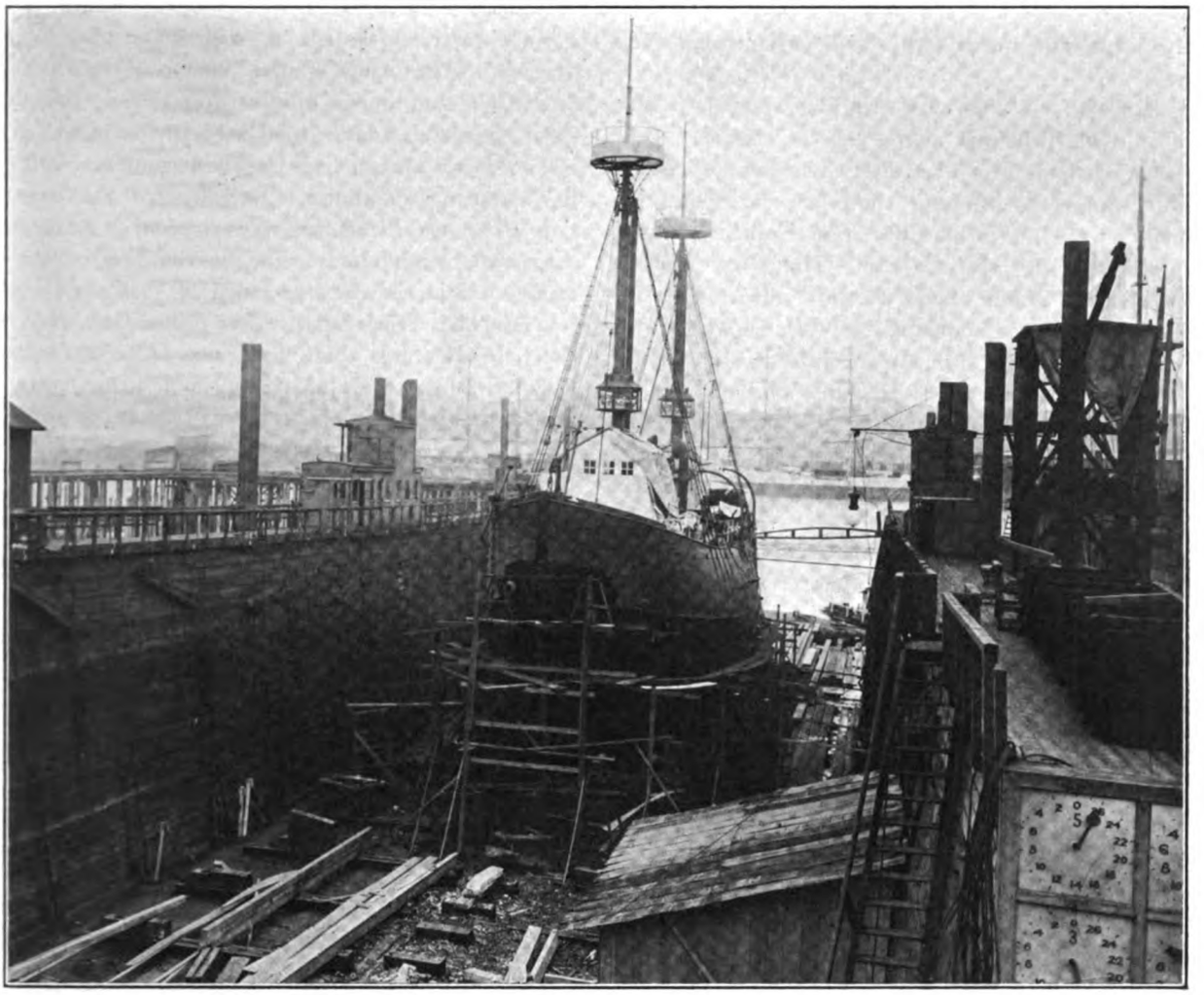
Other work at the yard aside from the "Santa Catalina" includes the Government lightship "No. 67," a picture of which is given herewith, and upon which work is progressing slowly; the steamer "Breakwater" has had several bulwark plates renewed, replacing plates damaged recently when the vessel encountered some extremely heavy weather.

The hull of the combination snag boat and dredger



The Columbia River breakwater in heavy weather.

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Government Lightship "No. 67" in the drydock at the yards of the Willamette Iron and Steel Works, Portland.

"Monticello" is now practically finished, and the installation of the machinery is going forward.

In the engineering line, the Willamette Iron Works has just turned out a set of 12" by 60" engines for the Northwest Fisheries Company of Seattle. These engines will be installed in a new stern-wheel cannery tender which is being built by J. F. Duthie.

The most valuable cargo of wheat ever shipped from the United States up to January 21st was sent forward on the British steamer "Devan City," sailing from Portland on the day mentioned. The "Devan City" carried 265,544 bushels, valued at $381,626. She was loaded by Balfour, Guthrie & Company.

The Port of Portland Commission has retired from the pilotage service at the mouth of the Columbia. The independent pilots will attend to this work in the future under the direction of Captain Gundersen, long and favorably known in these waters. The pilot boat "Joseph Pulitzer" has been turned over to the pilots, although the cost of operating the vessel will be paid by the Port of Portland.

A bill is before the State Legislature reducing the maximum charge for pilotage from $5.00 per foot draft and two cents per ton net registered tonnage, to $2.50 per foot draft and two cents per ton net registered tonnage. *The actual rate now charged is $1.50 and one cent.* The old rate of $5.00 and two cents was set a good many years ago and it seems a thing to be desired that the maximum charge allowed be brought within reason.

Probably no man along Portland's water front is better known than Bob McIntosh. He has repaired and lined scores of vessels in the past twenty-five years and it fell to his lot to line the British steamer "Cranley," which carried Oregon's contribution to the Belgian Relief Committee. Bob did his share for the sake of Sweet Charity.

Captain L. Veysey, surveyor to Lloyd's Register, has gone into the shiplining business at Portland.

It is understood that the Border Line Transportation Company has been looking over Portland's shipping facilities and business potentialities with a view to including this port in the itinerary of their Alaska route steamers.

The channel on the Grays Harbor bar has been greatly improved during the past six months and there is now a depth of 23 feet on the bar at mean low tide, which means 31 to 32 feet on the flood tide. As 24 feet on the bar is the object of the Government engineers it would appear that the building

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of the south and north jetties will easily fulfill their object.

On the 8th of February, leading steamship men from all the principal ports on the Pacific Coast met in Portland to form a Federation of Water Front Employers. Among those present from San Francisco were: Harold Ebey, San Francisco representative of the Kosmos and Hamburg-Amerika Lines; Harry Young, head of the California Stevedoring and Ballast Company; C. W. Cooke, of the Williams, Dimond & Company, California agents for the American-Hawaiian Steamship Company; G. L. Blair, general manager of the San Francisco and Portland Steamship Company, and Captain Bennett of the Pacific Navigation Company. The officers elected by the Federation were: President, J. H. Bennett, San Francisco; vice-presidents, C. E. Kennedy, Portland, and C. W. Cooke, San Francisco; secretary, Harold H. Ebey, San Francisco; trustees, J. H. Bennett and C. E. Cook, San Francisco, W. D. Wells and C. E. Kennedy, Portland, D. C. Ward and J. S. Gibson, Seattle.

The grain tonnage due to arrive at Portland numbers 31 vessels with a tonnage of approximately 60,000. This excludes eight German vessels amounting to 20,244 tons, the arrival of which might reasonably be considered uncertain. Fifteen grain vessels are in port and loading with a tonnage of 28,566 tons.

The port of Portland Commission has decided to put the pilot boat "Joseph Pulitzer" on her station at the Columbia River bar. The "Pulitzer" has been laid up for practically two years. Since coming to this decision, the Commission has had the "Pulitzer" thoroughly overhauled on dry dock and she will be in first-class condition to take up the work required of her. It is planned to fit her with wireless and as she already has a powerful gasoline engine installed, she will go into commission well equipped for guiding vessels to and from the river.

Orders have been placed with Columbia River mills for 10,000,000 feet of lumber for the United Kingdom. This will probably make three full cargoes. It is not yet known what vessels will carry the lumber.

Tenders are being asked for repairs to the German four-masted steel bark "Dalbek." Surveys made and specifications drawn up by Captain Veysey, Lloyds' surveyor. The repairs are of an extensive nature including eighteen new frames. The "Dalbek" arrived at Portland July 28th and has been here disengaged ever since. 18,000 running feet of new decking has been put in by her crew together with other minor repairs.

Great preperations are under way for a grand celebration to commemorate the formal opening of the Celilo canal. This project has been in the minds of a great number of influential and far-seeing people of the Northwest for a number of years and its final completion is an event of the greatest importance to a vast territory which it will materially help to develop. The canal represents an expenditure of $4,850,000 and opens uninterrupted river navigation from Lewiston, Idaho, to the Pacific Ocean.

The Government has closed a contract with the St. Helens Shipbuilding Company for the construction of a new hull for the combined dredge and snagboat "Mathloma." The overhauling of the bar dredge "Chinook" was awarded to William Cornfoot for $33,927. The bid of the Williamette Iron and Steel Works for this work was $36,500 with an alternate proposal of $33,500 provided the "Chinook" was not turned over to them before March 1st, the reason for the latter proposal being that the concern was too busy with other work during February to properly care for the "Chinook" during that month.

SAN FRANCISCO.

The American-Mexican Steamship and Trading Company, J. C. V. Comfort, General Freight and Passenger Agent, has established itself at 149 California street. Up till the present time the San Francisco business of the firm has been carried on at the offices of William H. Thornley & Company, custom house brokers of 520 Battery street. The move was occasioned by the imperative need for larger quarters.

The San Francisco "Call" of January 27 has a splendid account of the accident to the "Marama" of the Union Steamship Company. The "terror-stricken passengers," the "jagged rocks," and the miraculous escape of the ship are luridly described. The "Marama" was so unfortunate as to "stave in her side" and the list reached "eighteen inches in the bow" before the vessel reached her dock. We are also informed that "both tanks filled with water and the armor plates had been sprung." Aside from the facts that there was no panic, no staving in of the side, no armor plates to get sprung and that most of the passengers did not find out that the ship struck anything until the excitement was all over, the Call's account is gratifyingly correct.

Captain James Bowen of the steamer "Coos Bay," which was sunk at the Ventura wharf on December 18th through being driven under the wharf by a heavy ground swell, has been exonerated by the local inspectors of hulls and boilers from all blame in connection with the accident.

The Northwestern Pacific Railroad is operating a regular ferry service between Sausalito and the fair grounds.

Mr. A. B. C. Denniston has been appointed general agent of the passenger department of the Great Northern Steamship Company with offices at 655 Market street. Denniston has been passenger agent for the Great Northern Railroad at Portland for the past six years.

The San Francisco Bar Pilots' Benevolent Association has returned the pilotage fees on the Belgian

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relief ships "Camino" and "Cranley." This is a graceful and splendid contribution towards the Belgian relief fund.

The offices of the local branch of Dodwell & Company, Limited, general agents on the Pacific coast for the Blue Funnel line, were moved on the first of the month from the Merchants' Exchange Building to the ground floor of the Marine Building on the corner of California and Front streets. The move was occasioned by the imperative necessity for more commodious quarters.

The Santa Fe Railroad has just completed a large wharf at Richmond. The new structure has been built with the special view of facilitating lumber shipments which have become quite heavy at this point.

The Luckenback steamers "Lyra" and "San Mateo" are to be renamed the "Hattie Luckenback" and the "Frederick Luckenback." The "San Mateo" has been a familiar ship on the Coast for many years.

Owing to the fact that the Oceanic Steamship Company was refused the Government mail contract that company has been compelled to abandon Pago Pago as a port of call on the homeward voyage of their ships from Australia. The Canadian-Australian line will attend to the mail carrying and the freight and passenger trade returning from Samoa.

As a result of the serious loss of life in the wreck of the "Hanalei," Duxbury reef will be the site of a new life-saving station. The former station at this point was abandoned in 1885 after the station buildings were destroyed by fire.

"We have been waiting for fifty years for private capital to provide for carrying American products to European ports."

Coming from Secretary McAdoo, the above quotation may be considered as an Administration remark. The sentence we quote and, in fact, Mr. McAdoo's entire speech is calculated to give a false impression of the situation as it exists to-day and has existed for many years past. As a matter of fact Congress has done everything within its power to discourage private capital from having anything to do with shipping and Congress has been fairly successful in its efforts along this line.

THE TRAVELING INSPECTOR.

The Shipping and Mercantile Gazette of London has the following to say in regard to the recently created office of Traveling Inspector by the Department of Commerce. The criticism reproduced below is, we believe, fair and just.

It is worth noting that in the United States the Department of Commerce has set a precedent which, if it is successful, may possibly have far-reaching consequences. This is nothing less than the establishment of the office of Traveling Inspector in connection with the Steamboat Inspection Service. This service is charged with overlooking the boilers, the hulls, and the life-saving equipment of vessels, and usually it discharges its duties when ships are at the piers. The Traveling Inspector is now to do his duty under actual working conditions, and it is considered that this will be far more effective than the normal method in securing observance of the regulations.

It is gathered that the inspection is to be confined to steamships engaged in short trips, for a suggestion is made that in the course of a single year the officer may travel upon perhaps a hundred different steamboats. It is stated that it will be his duty to have under observation "the whole working of the ship"; to note the number and condition of her lifeboats, the sufficiency of her lifebelts, and the thoroughness of fire and other drills. It is not quite clear whether the inspector is expected to have the run of the engine room or of the navigating bridge. Apparently it is optional to him, when he takes his ticket, to disclose his identity or to hide it. If he hides it he must depend upon his ability to make friends with officers and men if he wants to get everywhere about the ship. If his mission is openly acknowledged he may equally have little difficulty in seeing all he wants.

Official instructions say that the Traveling Inspector is to be neither a Government policeman nor a detective. He is to be just an inspector, traveling incognito or otherwise. On the other hand, it has been suggested that the whole scheme has the flavor of espionage, and we confess that it looks rather like it, however irreproachable the conduct of the Traveling Inspector may be. All the same, a New York contemporary not only approves the notion, but maintains that when the American mercantile marine grows bigger the inspection service should be enlarged "to keep a staff of men voyaging upon various ocean liners and freighters, so that 'safety at sea' may not remain a hypothesis."

We do not know whether ocean voyagers in British ships would feel any more comfortable because a Board of Trade inspector happened to be on board. But we rather think it would be contrary to the British instinct to set a spy upon the captain and his crew. It would be much better, if we must have inspectors on shipboard, to do the thing in an open way. We fancy, however, whatever the result of the American experiment, that there will have to be a considerable change of sentiment in this country before the example of the Steamboat Inspection Service is followed by our own Marine Department.

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GOVERNMENT ARMOR PLATE.

The Secretary of the Navy in his annual report renews the agitation in favor of establishing a Government-owned armor plant. "Twice the Government has authorized the construction of a factory," he asserts, "but twice were the armor plate works saved a monopoly of this business through a mysterious Providence." As a matter of fact the Government has twice yielded to common sense and refused to embark in the armor plate business. The arguments against such a venture are unanswerable as repeated investigations have demonstrated that it would be nothing short of abject folly for the United States to undertake any business of this kind. In 1897 an Armor Factory Board was created by Congress and thorough investigations were made on behalf of the Government by the late John Fritz. The unanimous conclusions of the members of the Board were as follows:

1. An armor-plate works comprises essentially a collection of special furnaces, heavy machine tools and appliances that are not needed in any other class of work and also a class of labor specially skilled in the business.

2. A Government armor-plate works not connected with an etsablishment engaged in other branches of the steel industry would depend for its success and economic administration upon a constant demand for an output nearly approaching its full capacity.

3. If the Government should establish an armor-plate works its efficient and economic maintenance or working would necessarily depend upon a constant yearly appropriation for ships to be provided with armor; the armor produced at any time must be specially designed for and fitted to these ships. Any failure to appropriate for such ships in any one year would require the cessation of work and the laying off indefinitely of the skilled experts and laborers that had been trained to that industry. A resumption of work at a later period would require the training, at a considerable expense, of a new set of men. In the meantime the progress of the art would perhaps have been such that difficult and radical changes would be required, which, under continuous working, might have been gradually and easily made.

This report holds just as true to-day as it did in 1897 and the Secretary and his advisers would be sadly at sea to embark upon any armor-making project. It is almost impossible to conceive, high as the price of armor plate is, that a Government plant devoted exclusively to the making of armor plate (we use the term "making" advisedly, for armor is not manufactured) would be able to cheapen the cost of our dreadnaughts one iota.

SHIPPING OUTLOOK.

Shipowners who have cargo boats available for certain lines of trade are admittedly making a large amount of money at the present time, although their position is nothing like so gold lined as the American lay press would have us believe. The greatest advance of general freight rates on any established route, as far as has come to our notice, is a little short of 50 per cent. When Cabinet officers of the United States make broad assertions that rates have advanced from 100 per cent. to 1000 per cent. they should have the grace to admit that they are not referring to regular lines of steamers, but to isolated cases which are explainable on the ground that their character practically makes of them blockade running ventures. While the freighter is facing an era of prosperity which is bound to keep up for at least two or three years after the present European war has been brought to a conclusion, the passenger ship in the trans-Atlantic trade, now to some extent profitably employed in transport service for some belligerent Government, has not such a roseate future to face. The reason for this is very easily discernable. The movement of artisans, laborers, farmers and emigrants in general from Europe to the Americas and Australia will be comparatively negligible for years to come after the war is over. France, Belgium, Austria and Germany will have ample constructive work for every able bodied man they possess to perform while the demand upon the products and industries of the countries of Southern Europe will be great enough to effectually check emigration. The very heavy falling off in income from steerage passengers will result in a marked increase in first-class fares on trans-Atlantic voyages, or else the speed mania will be sacrificed and the steerage loss offset by a saving in fuel.

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GOVERNMENT OWNERSHIP UNECONOMIC.

The Pacific Marine Review does not believe that the Ship Purchase Bill can possibly accomplish the objects which its sponsors claim it will, but nevertheless we hope that the Bill becomes law and that its provisions are put into effect. Shipping interests in this country, and especially those few concerns engaged in foreign trade, have been kicked about from pillar to post so long that the bug-a-boo of Government competition can add but little to their troubles. If the Government goes into the shipping business in a serious manner and honestly tries to make the operation of their merchant ships a commercial success, the same obstacles and difficulties will be encountered that have confronted the privately-owned vessel and the Government will see another side of a vexed question from the one which it has been gazing upon for the past eighty years.

The Australian Government has utterly failed in its steamship venture. It sought to operate two handy little coasting vessels and had to stand for a loss of $100,000 a year. If our Government is to operate a large fleet, the deficit, if any, is going to be a large one. If the deficit is large the line will not continue to operate for many years and the treasury will put up for a large loss occasioned by the failure to realize the book value of the Government fleet when that fleet is put under the hammer. But whether the Government merchantmen prove successes or failures, the powers that be at Washington will learn some first-handed truths about the steamship business and will find that it is not all beer and skittles for the shipowner.

PRACTICALLY AN ADMISSION OF ERROR.

A bill was recently introduced into Congress legalizing the collection of tolls on deck loads at the Panama Canal. The bill was quietly introduced and just as quietly defeated. This action throws rather a peculiar side light on the question of collecting tolls on deck loads. A careful reading of the toll fixing clauses of the Panama Canal act plainly indicates, at least to the lay mind, that the collection of deck load tolls is illegal. That such a bill should be introduced would surely indicate that its backers and sponsors are willing to admit that the tolls so far received from the taxation of deck loads have been illegally collected. As far as we are able to judge, the clause of the Panama Canal Act limiting the amount of tolls must supersede other clauses pertaining to deck load tolls and the proponents of the free deck load have so far had all the best of the argument.

According to Professor Emory Johnson, the imposition of deck load tolls was made with a view to discouraging "unsafe" conditions due to overloading lumber carrying vessels. It would appear that the Professor had overshot the mark. Tolls or no tolls, a lumber carrier will fill up below decks and then carry a deck load, and a big one at that; if she doesn't she will go out of business. It would have been a far simpler matter and one fair to all concerned for the Government officials to have made individual cases of all steamers carrying lumber as a deck load through the Canal by affixing on the vessel's Panama tonnage document a clause fixing the limits of deck load tonnage allowable.

We believe that had President Wilson gone outside the University in his search for some one to fix rules governing the use of the Panama Canal he would have fared better and avoided the present controversy. The whole matter illustrates the evils of procrastination at Washington. The tolls question might have and should have been settled in all its aspects long before the canal was opened.

OCEAN FREIGHTERS.

Ocean freight rates are high at the present time and will remain high for several years to come. Of course abnormal conditions brought about by the war will more or less disappear when the present conflict is closed, but, nevertheless certain conditions, now considered abnormal, will continue to have a boosting influence on ocean freights. Practically every neutral nation to-day is under a heavy demand for articles of which they produce a surplus. This demand occurs at the same time as a shortage of ships and the law of supply and demand sends freights soaring. It is inconceivable that the cessation of hostilities will change to any great degree either the nature or the quantity of the demands being made upon neutral nations. All through central Europe the war will be followed by a period of reconstruction and the surplus of the neutral nations will be consumed eagerly by the millions of patient toilers engaged in rehabilitating the wrecks of their different homelands.

The people of Great Britain seem to have realized this and the demand for new tonnage is taxing their numberless shipyards to their full capacity. The United States, to a lesser degree, is feeling the boom in shipbuilding although the prices for new tonnage have not advanced to such an extent as they have in Great Britain, twenty per cent. and upwards. The concern which builds well-balanced cargo carriers at the present time will make no mistake as they will be completed in ample time to enjoy several fat years of service before the general freight level drops as low as it was before the present conflict began.

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Review of Naval Reports

THE reports herein referred to are those of the Secretary of the Navy, and of the General Board of the United States Navy. Of the two documents the latter is necessarily the most important, considered from a constructional or tactical viewpoint, as the Secretary's report, as far as ships and new construction are concerned, is to a great extent inspired by his technical advisers in the Department. The fact that the Secretary of the Navy in this country is always a civilian who has not necessarily any special knowledge of naval subjects and who does not remain in office long enough to learn very much regarding such subjects, makes his task of recommending future naval policies a delicate one. A comparison of the two reports would seem to indicate that the Secretary is more dubious concerning certain well defined policies of our Navy than his advisers are.

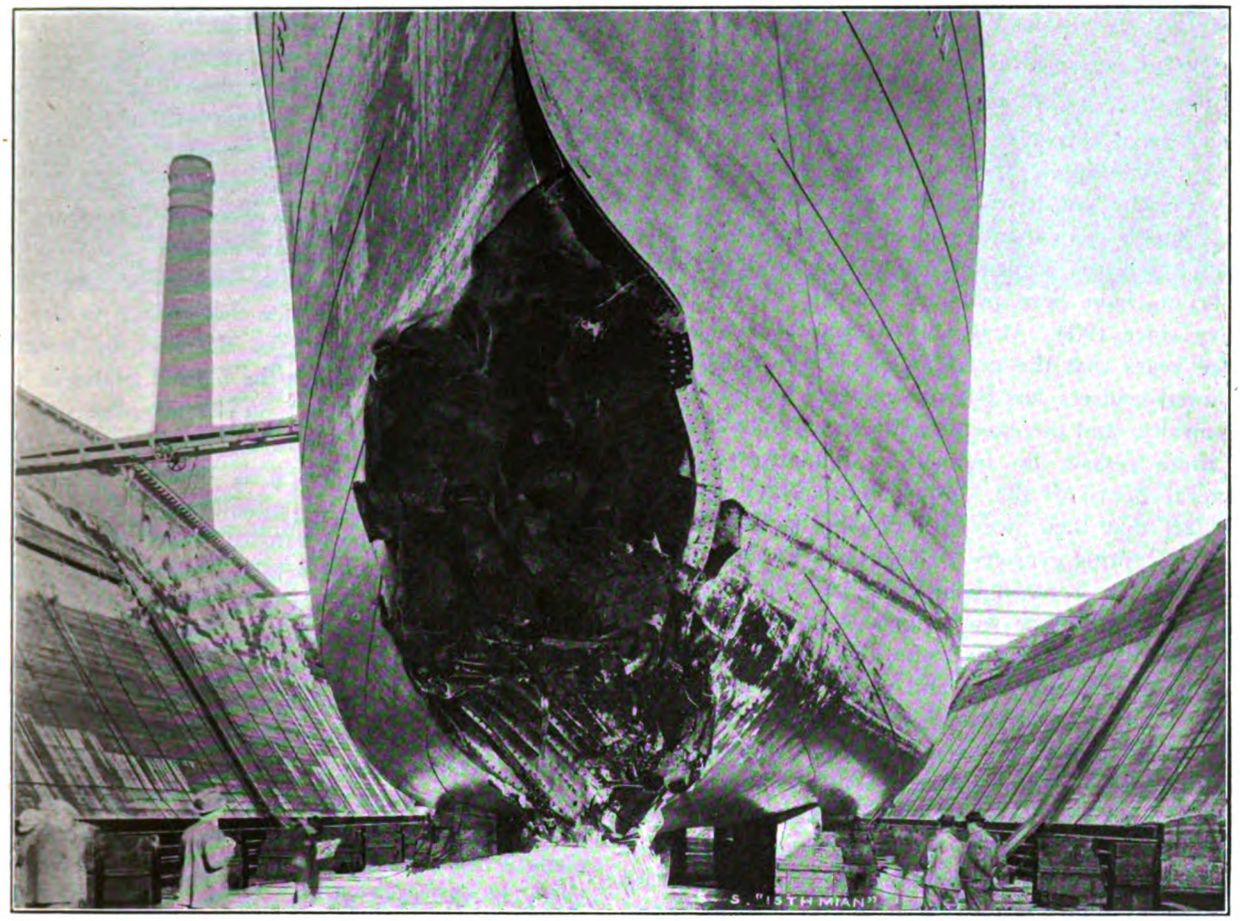
In laying down the guiding principles for the permanent upbuilding of our Navy, the General Board of Admirals, which is presided over by Admiral Dewey, who has always been a close student of fleet coordination, deals by inference with the important question of submarines versus battleships. "Command of the sea can only be gained and held by vessels that can take and keep the sea in all times and in all weathers, and overcome the strongest enemy vessels that may be brought against them." This has always been a general axiom with the Board, and up to the present moment nothing has happened to make its members alter their opinions. Furthermore, the naval engagements of the present war have confirmed the Board's opinion as being correct rather than detracting from it. Admiral Von Spee's squadron triumphed over Admiral Cradock's fleet in the South Pacific owing to its superior striking force coupled with the tactical advantage of greater speed. Admiral Von Spee's ships were later destroyed by Admiral Sturdee's fleet for the same identical reasons. Battleship building will continue in the United States, but what will be the changes in the structural details in the battleship of the future? Ships of the most modern type are to a great extent at the mercy of a well directed torpedo or of a powerful submerged mine, and both of these destructive agents have done considerable damage in the present war. Whatever constructional details will be altered to meet these dangers are matters which our naval constructors cannot be expected to divulge for the present at least.

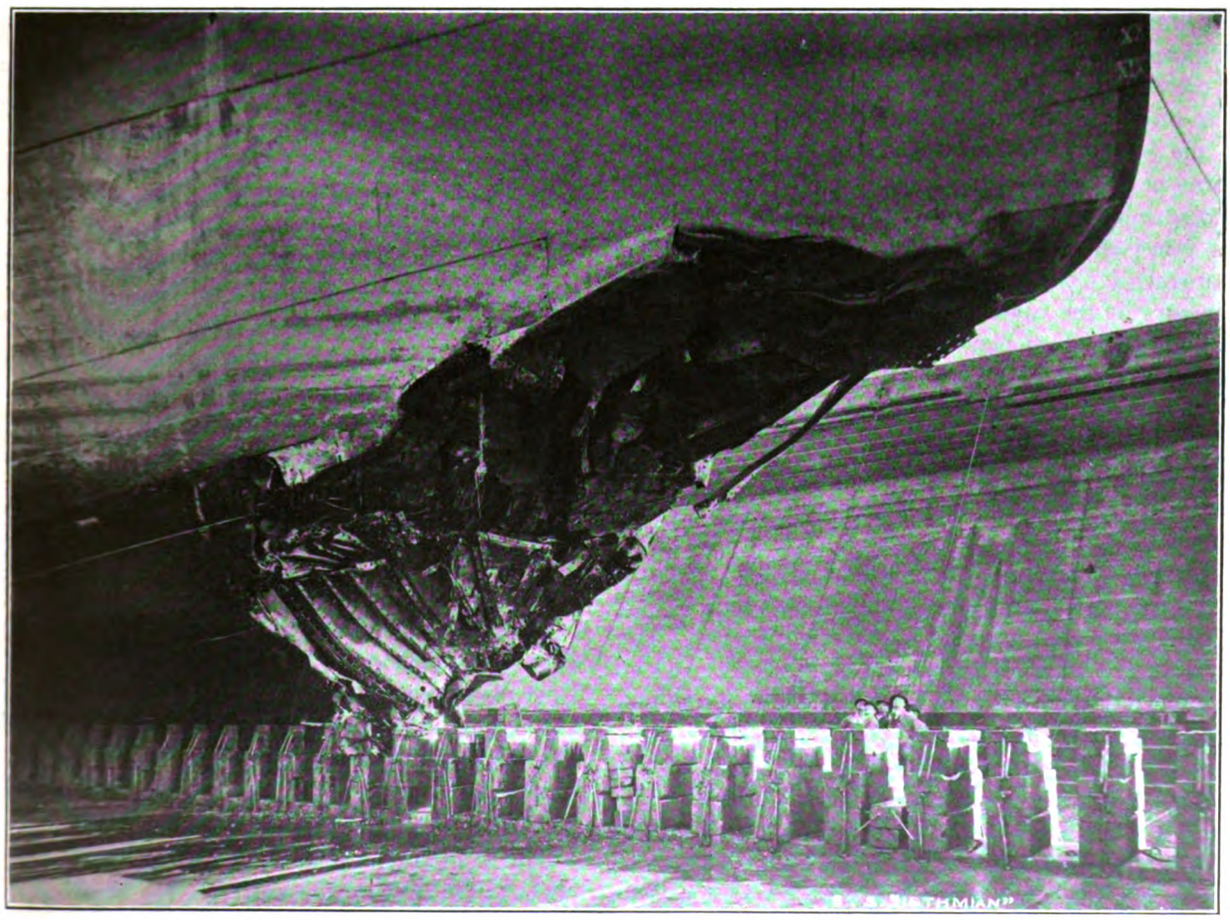
The General Board, while recommending the construction of an increased number of fleet and coast submarines, refrains from entering into any discussion of the superiority of this type of naval vessel. They recommend that three fleet submarines with a wide radius of action be constructed. The Secretary, however, proposes to build only one of these seagoing vessels, notwithstanding that he takes upon himself to give views strongly supporting the advantages of the submarine. He states that recent developments in naval warfare have strengthened faith in the efficacy of the submarine; and that there are many who believe that the time has come when the advice of Sir Percy Scott should be taken. Months ago that able English officer declared that the submarine was the most effective ship of the navy of the future and advised a cessation of the rapid construction of dreadnaughts and the utilization of the money thus saved in building large numbers of submarines.

The public, to a large extent, has accepted this view, but naval officers, or the majority of them, are convinced that submarines should not replace the larger craft. When the successes of the submarine in the present war are analyzed it becomes apparent that they were largely brought about by exceptionally favorable conditions. The British fleet is almost continuously open to the attack of German submarines, while, on the other hand, the English submarine has, up to the present time, had few favorable opportunities to prove if it be as efficient as the German underwater forces. A naval war involving the United States would of necessity be of a different character from that in which the European nations are now engaged. The submarines, especially those of the enemy, could not be expected to take as prominent a part in such a conflict as they have done in the comparatively restricted waters of the North Sea and the English Channel. The Secretary states that "as long as the bulk of the ablest naval officers believe that the increase of the Navy should embrace in fair proportion the dreadnaught, the destroyer and the submarine, the Secretary would not feel warranted in recommending a widely different program of construction." However, while the General Board suggested four dreadnaughts, three sea-going submarines, and sixteen coast submarines, the head of the Navy is satisfied in recommending two dreadnaughts, one sea-going submarine, and seven or more of the coast-defense type. This latter type, the General board thinks, should be a small vessel to act in home waters only. Any addition to size they consider detrimental, because any increased draft debars them from operating in shallow waters, while high speed is not needed, and is gained at the expense of other desirable qualities. The sea-going boat, on the other hand, ought to be of sufficient size, radius of action, habitability, and surface speed, to accompany and act with the fleet tactically at all times. The Board do not think that there is need in naval warfare for an intermediate type.

The General Board, indeed, place the destroyer as next in importance to the battleship. After very mature consideration of all the elements involved in a

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The protographs herewith illustrate the extent of the damage suffered by the American-Hawaiian steamer "Isthmian," when she ran ashore on a Cedros Island reef in the same locality and at the same time as the motor ship "Malakka" came to grief. Despite the damage shown, the forward bulkhead remained perfectly watertight and no cargo was damaged.

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study of the results obtained from fleet maneuvers, the Board came to the conclusion that a well-balanced fighting fleet for all purposes of offense and defense should have a relative proportion of four destroyers to one battleship. Their recommendation, therefore, was for the construction of sixteen destroyers, but Mr. Daniels recommends only six. As regards scouts, again reference is made to the fact that no cruisers or scouts have been provided for the United States Navy since 1904. It is only within the last two or three years that the need for very high-speed light-armored cruisers has been recognized by the British Admiralty; and the exceptionally serviceable character of these vessels has been fully demonstrated. The General Board of the United States Navy points to the fact that their fleet is peculiarly lacking in successful scouting cruisers, so necessary in obtaining information in a naval campaign, and of such great value in clearing the sea of torpedo and mining craft, in opening and protecting routes of trade for our own commerce, and enclosing and prohibiting such routes to the commerce of the enemy. This branch of the fleet, they think, has been too long neglected, and they recommend the construction of four such scout-cruisers; but their recommendation has not been accepted by the Secretary. Similarly, the American Navy is deficient in gun-boats, those on the list being obsolescent. The result is that in recent years it has been necessary to detail battleships, large cruisers, and destroyers to do gun-boat duty—notably on the Mexican coast. This is held as a harmful influence on the efficiency and training of the fleet for war, and it is recommended that a beginning should be made by the building of four such vessels to replace the worn-out gun-boats on the list. But here, again, the recommendation is only partially accepted, and only one gun-boat has been put on the official list for the approval of Congress. We are surprised to find no reference by the General Board to the utility of monitors—a type which played a great part in the American Civil War. The brilliant success off the coast of Flanders in cooperation with the Allies field forces of the three monitors built by Vickers from the design of their naval constructor, Mr. T. G. Owens, has renewed the belief in the efficiency of this type of ship.

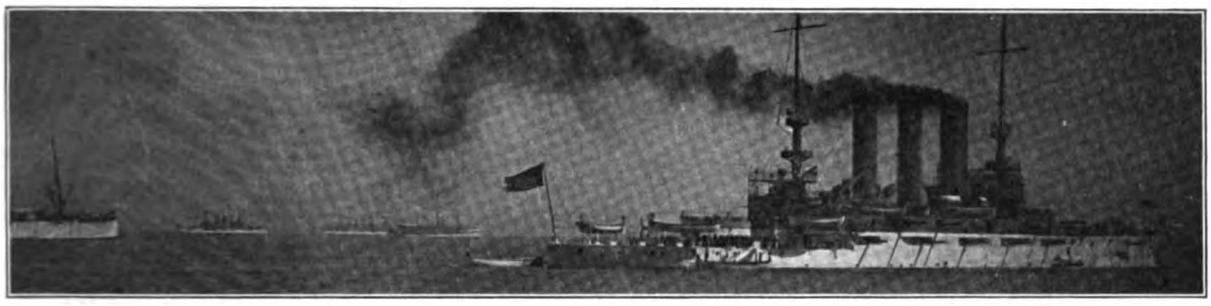
Regarding aircraft, the General Board and the Secretary fully recognize the potentialities of the "new arm," and attention is directed to the "dangerous situation of the country," owing to the lack of aircraft and airmen in both the naval and military services. Early in the past year a board of experienced officers was appointed by the Secretary to consider and make recommendations for the development of aeronautics in the Navy. This board recommended the establishment of a station at Pensacola, in Florida, and orders were given for foreign-built aeroplanes, in addition to others made in the States, in order that experience should be collated for the development of a type suitable for the Navy. The war, however, rendered impossible the obtainment of aeroplanes from abroad, and those of American manufacture were alone supplied. But instead of fifty aeroplanes, a fleet dirigible, and two small dirigibles being available, there are now twelve aeroplanes, only two of which are of the same type, and all are of too little speed and carrying capacity. The General Board show the importance they attach to the "new arm" in the composition of the fleet by remarking that the state of affairs in the United States is "nothing less than deplorable." They take the view that, as now developed, aircraft are the eyes of both armies and navies, and it is difficult to place any limits to their offensive possibilities. "Without them the Navy has not the means of detecting the presence of submarines or mine-fields, or of attempting direct attack on the enemy from the air, while her own movements would be an open book to him."

It will thus be seen that the report by Admiral Dewey's Board, while apparently a colorless document as far as current events is concerned, is an interesting commentary on the progress of naval operations at the present moment. The Board presents a well-balanced policy along which progress may be made in the establishment of a navy which they consider, in the case of the United States, should include, by 1919, forty-eight battleships, as enunciated eleven years ago, whereas at the present time the probabilities are that this battleship fleet will have only thirty-seven ships. It is thus evidently necessary to accelerate the battleship program, and to also build other types of ships to act in co-operation with the battleships, while the suggestion of the moment for next year's program is based upon four battleships. These, the Board consider, involve the building also of sixteen destroyers, three fleet and sixteen coast submarines, four scouts, four gun-boats, two oil-fuel ships, one destroyer tender, one submarine tender, one navy transport, one hospital ship, and one supply ship, with a vote of one million for air service. But the official program to be placed before Congress calls for the building of only two dreadnaughts, six destroyers, one sea-going and seven or more coast-defense submarines, one gun-boat, and one oil-fuel ship.

Bids received from three firms by the Seattle Port Commission for furnishing the cement for the East Waterway improvements were rejected. Bids are being readvertised to be opened March 3. The Superior Portland Cement Company was low bidder at $2.25 a sack.

The Lilico Launch & Towboat Company has placed a $12,000 order with E. W. Heath & Company for the construction of a cruiser.

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European Marine Notes

[From our own Correspondent.]

London, Feb. 10, 1915.

British Shipbuilding in 1914.

The British shipping industry has certainly profited by the war to an enormous extent. Up to August or September the year 1914 was only a poor one for the shipping trade, but the boom which developed later made 1914 a memorable year. And, furthermore, the expectation is that 1915 will show even better average results. December has shown no less activity in the ordering of new tonnage than November, and most of our shipbuilders have now a heavy amount of work on hand. It may be recalled, as applicable to conditions as they exist to-day, that the figures given in the Shipbuilding Returns of Lloyd's Register for the last quarter were confined to merchant ships in course of construction in the United Kingdom. Excluding warships—a most important reservation in present circumstances—and only taking into account vessels of 100 tons and upwards, the construction of which had actually begun, it was stated there were 486 vessels of 1,723,550 tons gross in course of building in the United Kingdom at the end of September, practically all of them steel steamers. At the same time, the register provided us with a cautionary footnote as follows: "Whilst the tonnage now under construction in the United Kingdom is about 1400 higher than that which was on hand at the end of last quarter, it will be understood that the rate of progress in merchant ship construction is much reduced in the present circumstances, and that the immediate output will be correspondingly less than that which would be attained under normal conditions."

War and Output.

It will be understood that in the figures returned by the majority of British shipbuilding firms no account is taken of warship work, and the conditions prevailing at the works of Cammell Laird & Company, Birkenhead, may be cited as an example of those existing at other large establishments which are heavily engaged on naval construction. Cammell Laird informed your correspondent that during 1914 their output of shipbuilding and engineering work exceeds in volume that of any previous year in the firm's history. The gross merchant tonnage launched during the year amounted to 38,019. These shipbuilding and engineering works have, generally speaking, been well supplied with work throughout the past twelve months, though it was noticed that, even prior to the war, inquiries for merchant vessels were becoming considerably scarcer than for some time previous. Shortage of men in certain of the skilled trades and loss of time by men in other departments have had the effect of somewhat hindering the progress of the work; but there have been no serious labor troubles. It is worthy of mention that nearly 400 of the workmen and staff at the company's Sheffield works alone have joined his Majesty's forces, and their number would doubtless have been largely increased but for the firm's stronger claims on the services of its employees for Government work.

Mercantile Work.

The largest output to the credit of any firm was that of Harland & Wolff, who launched, at Belfast, Glasgow and Irvine, eleven vessels of 182,759 tons and 149,590 indicated horsepower. Their largest vessel was the White Star Liner "Britannic," of 50,000 tons, but they have launched two other ships, each of which is over 27,000 tons. The second largest total for the year is that of Swan, Hunter, and Wigham Richardson & Co. (Limited), of Newcastle-on-Tyne, who launched eighteen vessels of 82,627 tons and 56,930 indicated horsepower. The horsepower includes five twin-screw and eight single-screw sets of engines, and boilers of 42,440 horsepower, built at the firm's Neptune Engine Works. Two of these were "Neptune-Diesel" engines, for a twin-screw vessel. It may be added that William Beardmore & Co. (Limited), Naval Construction Works, Dalmuir, on account of the war, are not issuing their annual return of tonnage this year.

A Typical Tanker.

As an example of modern steel screw tank steamer work your correspondent might mention the "Lompoc," recently launched to the order of the Bear

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Creek Oil & Shipping Company, Limited. This is the largest oil tank steamer yet built on the Clyde. Her dimensions are 448′ by 56′ by 33′ 6″, with a deadweight carrying capacity of about 10,500 tons; she is constructed on the Isherwood longitudinal system to class 100 A1 at Lloyd's, and is of the two-deck type with poop, bridge and forecastle. The water ballast is carried in double bottom under the boilers and in a deep tank forward of oil compartments and also in forward and after peaks. The vessel is fitted to carry oil in bulk for which purpose she has ten holds with center divisional bulkheads making 20 tanks, and in addition to this she has a large sized cargo hold forward. An expansion trunk extending 6 feet above the upper deck is fitted the full length of the oil compartments and summer tanks are fitted in the 'tween decks. Two pump rooms are fitted in which are placed three powerful oil pumps connected to a double line of pipes. Ample bunker capacity is retained aft for both coal and oil fuel. The vessel is replete with everything necessary for the working of the cargo and the safety of the ship, and includes two steam winches, refrigerating chambers for crew's provisions and a complete installation of electric light. Accommodation is porvided amidships for captain and officers, aft for engineers and forward for seamen and firemen. The machinery, as in the most recent type of oil steamers, is placed aft and consists of triple expansion engines, having cylinders 27″, 46″ and 76″ diameter by 48″ stroke, and there are three single ended boilers worked on Howden's forced draught system at 180 pounds pressure. The boilers are arranged to burn either coal or oil, the oil fuel burning installation being on the Wallsend Howden system.

Built for Antwerp's Future.

On the last day of December Harland & Wolff launched the fine large passenger Red Star Liner "Belgenland." I give a picture of her in position. The rentention of the name "Belgenland" for the steamer and of Antwerp as the port of registry is interesting in the present condition of affairs. In due time it is expected that she will take her place in the Antwerp-New York service under the Belgian flag; and it will be very appropriate that the Red Star sailings from Antwerp should be resumed by a larger steamer than any hitherto sailing to that port.

The "Belgenland" is a triple screw passenger steamer about 700 feet long and 78 feet beam, with a gross tonnage of approximately 27,000 tons and 33,000 tons displacement. She has been constructed on the latest and most approved principles, the double bottom extending right fore and aft and the watertight bulkheads carried up to the awning deck. There are seven steel decks besides the orlop deck and the bridge deck.

There are ten double-ended boilers 15′ 9″ diameter by 20′ 0″ long, each with six Morrison furnaces, the opposite furnaces led into a common combustion chamber. The boilers have been constructed in accordance with the rules of the Board of Trade for a working pressure of 215 pounds per square inch, and are arranged to work with natural draught. Four patent hydraulic ash expellers are fitted in the boiler rooms.

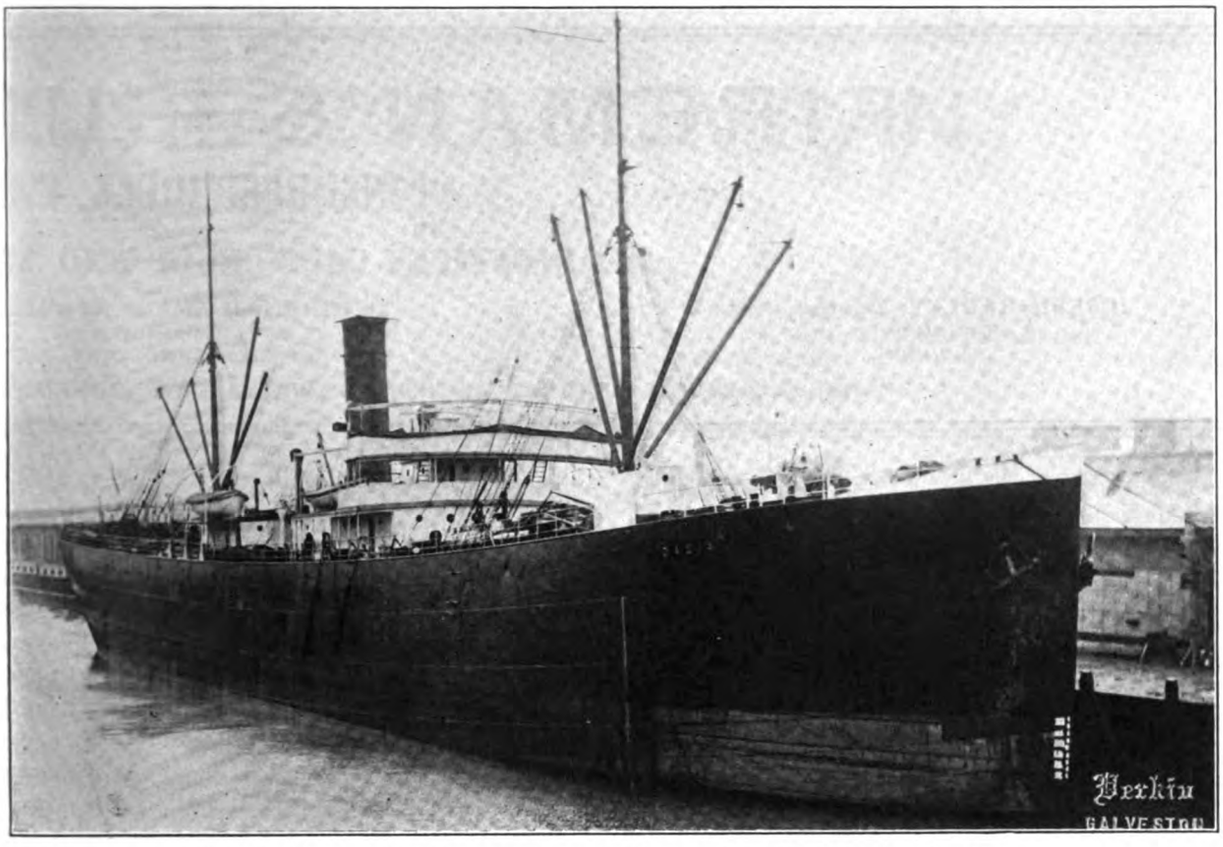
The propelling machinery of the "Belgenland" consists of two sets of reciprocating engines driving the wing propellers, and one low pressure turbine driving the center propeller. The reciprocating engines are of the inverted direct acting four-crank triple expansion type, balanced on the Yarrow Schlick and Tweedy system, having four inverted direct acting cylinders, 35½″, 56″, 64″, and 64″ diameter by 5′ 0″ stroke, and designed for a working pressure of 215 pounds per square inch. The turbine is of the Parsons reaction type and designed to operate in the ahead direction only, by exhaust steam from the reciprocating engines.

Marine Motor Industry.

Admiralty work is keeping the majority of marine motor works exceptionally busy, and those firms which have not as yet built to Government orders are now tendering, with every prospect of success. It is interesting to mention that the twin-screw motorship "Mississippi" arrived in the Thames at the end of December on the successful completion of her maiden voyage, during which the weather was extremely rough, to America and back. The "Mississippi," which is possibly the most important motor vessel that has yet been constructed in Great Britain, was built for the Atlantic Transport Company, by Harland & Wolff, at Glasgow. The vessel is 370′ in length, and has a deadweight capacity of over 6500 tons. There are two six-cylinder four-cycle Diesel engines, each of which develops about 1800 indicated horsepower, and at full power a speed of over twelve knots is attained.

The Ocean Marine Insurance Co. Ltd.
of London
H. M. NEWHALL & CO., General Agents
T. S. DEERING, Underwriter
NEWHALL BUILDING SAN FRANCISCO

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The "Dacia," a ship that has been much in the public eye for the past month.

Shipping Notes

A new Chinese steamship company has just been formed at Peking, American and Chinese capital being mutually interested. It is the purpose of the new concern to inaugurate a service between China, Gulf ports and New York.

The Ocean Steamship Company of Savannah is to build two large steamers to replace the "City of Augusta" and the "Nacoochee" on the Boston-Savannah run.

The Rederiaktiebolaget "Nordstjernan" of Stockholm have just accepted their third sister motorship from her builders Messrs. Burmeister & Wain of Copenhagen. This ship, the "Pacific" is a sister to the "Kronprins Gustaf Adolf" and the "Kronprincessan Margareta." She is 362′ 0″ between perpendiculars, 51′ 3″ beam, 23′ 1″ load draft and of 6550 tons deadweight capacity. The engines are four cylinder, four-stroke Diesels of 2000 indicated horsepower. On her trial the "Pacific" developed a speed of 11.41 knots at 2032.5 I.H.P. and 152.5 revolutions. The fuel oil consumption was 308.7 kgs. per hour, including the consumption of all auxiliaries.

The Coast Guard bill, which consolidates the Life-Saving and the Revenue-Cutter services, has been signed by President Wilson and is now in operation. The bill provides more simplicity in the operation of these two branches of Government activity and also provides permanency and pensions for the coast guardsmen. From a naval point of view the measure is of importance as it provides a permanent and high-class naval reserve force of over four thousand men.

The Red Star liner "Kroonland" is now well on her way round South America, having left New York on January 21 for an 82-day tour which includes practically a complete circuit of the South American continent. The "Kroonland" will have the honor of introducing the American flag floating over a passenger ship to several important southern ports.

Plans are under way for a joint improvement of the Uruguay River by the Argentine republic, Uruguay and Brazil. The navigable length of the river would be increased 419 miles if the plans of the concessionaries are carried out and the cost of the project would be in the neighborhood of $30,000,000.

A Danish corporation has contracted with the Chilean government to establish three lines of steamers between Copenhagen and Chile, one of which will make Guayaquil a port of call.

The Coastwise Transportation Company of Boston is reported to have placed an order for two 9000-ton deadweight steamers with the New York Shipbuilding Company of Camden, New Jersey.

The American-Hawaiian steamer "Washingtonian" was in collision with the schooner "Elizabeth Palmer" off Cape Henlopen on January 26, in thick weather.

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FIREMAN'S FUND
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The schooner struck the steamer amidships, evidently opening both the engine and boiler room to the sea. Both vessels sank. One life lost. The crews were rescued by the Fenwick Island lightship and the steamer "Hamilton."

The "Camino," which was acting as the San Francisco-Belgian relief ship, developed boiler trouble which was probably aggravated by heavy weather. The "Camino" being of a design that carries as high as 60% of the total cargo as a deck load would be so stiff with all her cargo below deck that short violent rolling probably caused her troubles. She was towed into Halifax where extensive repairs will be effected.

Mr. Fred Olsen, one of the greatest shipowners in Norway, has let contracts for four Diesel engined ships. These vessels will be used in service between Norway and the west coast of North America.

The steamer "Metapan" of the United Fruit Company's large fleet recently had oil-burning apparatus installed during her annual overhaul. Should the venture on the "Metapan" prove successful all the United Fruit boats will be changed over to oil burners.

The American-Hawaiian Steamship Company has contracted with the Maryland Steel Company for three new vessels. One craft is to replace the "Washingtonian," the 10,000-ton freighter recently sunk through collision on the Atlantic, and the other two vessels will be built with a special view to carrying lumber on their eastward run. There has been a heavy demand on the American-Hawaiian for space for lumber, but the company's freighters are not specially adapted to handling lumber cargoes.

The British steamer "Marama" touched a reef off Montara Point at the northerly end of Half Moon Bay. The vessel swerved off into deep water with apparently little damage, a couple of double bottom compartments filling. Later upon being docked at San Francisco extensive damage to the outer skin from amidships aft was found. Between fifty and sixty plates are affected and quite a few frames both port and starboard.

The submarine L-1, built for the Electric Boat Company by the Fore River Shipbuilding Corporation of Quincy, Massachusetts, was successfully launched on January 20th. The new under-water craft is 170′ 0″ long and has a submerged displacement of about 600 tons. The surface propelling machinery consists of twin Diesel engines of the New London Ship & Engine Company type, while the under-water driving is accomplished by electric motors. A surface speed of 14 knots and a submerged speed of nine knots are required on the vessel's speed tests.

"Shipbuilding and Shipping Record" recently contained an interesting table setting forth the position of the principal German shipowners in regard to tonnage lost through the war, either on account of being captured or sunk by the Allies. While the losses to some lines appear particularly heavy, the entire list shows that only about 20 per cent. of the total number of ships belonging to the companies listed have been captured, and such a loss, while very severe, is not absolutely fatal to the interests at stake.

Owners.	Number of boats owned.	Captured or sunk.
Hamburg-Amerika Line.....	181	24
Norddeutscher Lloyd	120	22
Neptun Co.	75	13
Hansa Line	68	30
Austrian Lloyd	62	5
German-Levant	60	12
German Australian	56	19
Hamburg South American...	49	3
Woermann Linie	43	19
Deutsche-Amerika Petrol Ges.	41	2
Adria Company	35	4
Kosmos Line	30	3
Argo Co.	29	9
German East Africa.....	26	5
Rhed. von 1896.....	26	9
Oldenburg Potugiesische	25	5
Roland Line	16	2
Laeisz Line	16	2
Rickmers Company	15	6
H. C. Horn.....	14	3
Aug. Bolton	14	4
Hamburg-Bremer Africa Linie	13	2
Hungarian Levant	12	3
J. Jost	5	4

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F. HERRMANN & CO., Managers
ATLANTIC MARINE DEPARTMENT
87-43 WALL STREET NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

The very heavy weather experienced all along the coast in the early part of February affected a portion of the Columbia River south jetty. About one mile of the retaining trestle was washed out and the rock fill settled somewhat.

On January 20th the Seattle-Liverpool service of the Blue Funnel Line via the Suez Canal and ports in the Orient was formally brought to a close. This action comes as a direct result of the completion of the Panama Canal, the service now dividing itself between two distinct routes. One branch of the big carrying fleet will operate from Puget Sound direct to the Orient. The other group of ships will operate from Liverpool through the Panama Canal to San Francisco, Puget Sound ports and Vancouver. The reason for the abandoning of the old route was the saving of time via Panama. From Liverpool to Puget Sound via the Oriental ports has been taking the Blue Funnel steamers seventy-five days, but it is now the hope of the Company to land freight in Seattle only thirty-five days from Liverpool

Captain Lukens of the Coast and Geodetic Survey has performed a splendid and fruitful task in discovering a navigable channel through the great submerged mud flats at the mouth of the Kuskokwin River in Alaska. This means the opening up of 600 miles of navigable waterway and an opportunity to develop Alaska's second richest valley. Captain Lukens stuck steadily to his appointed task for four seasons, taking no less than 14,256 soundings under conditions that were far from favorable. The Kuskokwin valley is rich in gold bearing quartz, mercury cinnabar, etc.

The Maryland Steel Company, besides securing the contract to replace the American-Hawaiian steamer "Washingtonian," has secured an order from the A. H. Bull Steamship Company of New York for a single screw, 10 knot steel cargo boat of 5000 tons deadweight capacity. The new steamer will be 340′ 0″ over all, 328′ 6″ between perpendiculars, 46′ 0″ beam and 26′ 6″ molded depth. She will be built on the Isherwood system. Delivery is promised in ten and one-half months.

Burmeister & Wain are constructing two fine motor ships for Frederick Olsen, a Scandinavian shipowner. The new craft will be 425 feet long by 55 feet beam by 38′ 6″ molded depth, and will cost in the neighborhood of $2,000,000.

The Development Board of the Bahama Government has authorized the American Consul at Nassua to conclude arrangements for a steamship service to Jacksonville, Florida. The Bahama Government offers a subsidy of $6,000 for three months and it is understood that Jacksonville interests will charter a steamer of about 700 tons deadweight and start a service.

The year 1914 was marked by heavy losses for American underwriters. Up to December 1st insurance losses totaled about $15,000,000, which eclipses the totals of former years. The loss of the "Washingtonian" and the "Malakka" were largely responsible for the heavy loss showing.

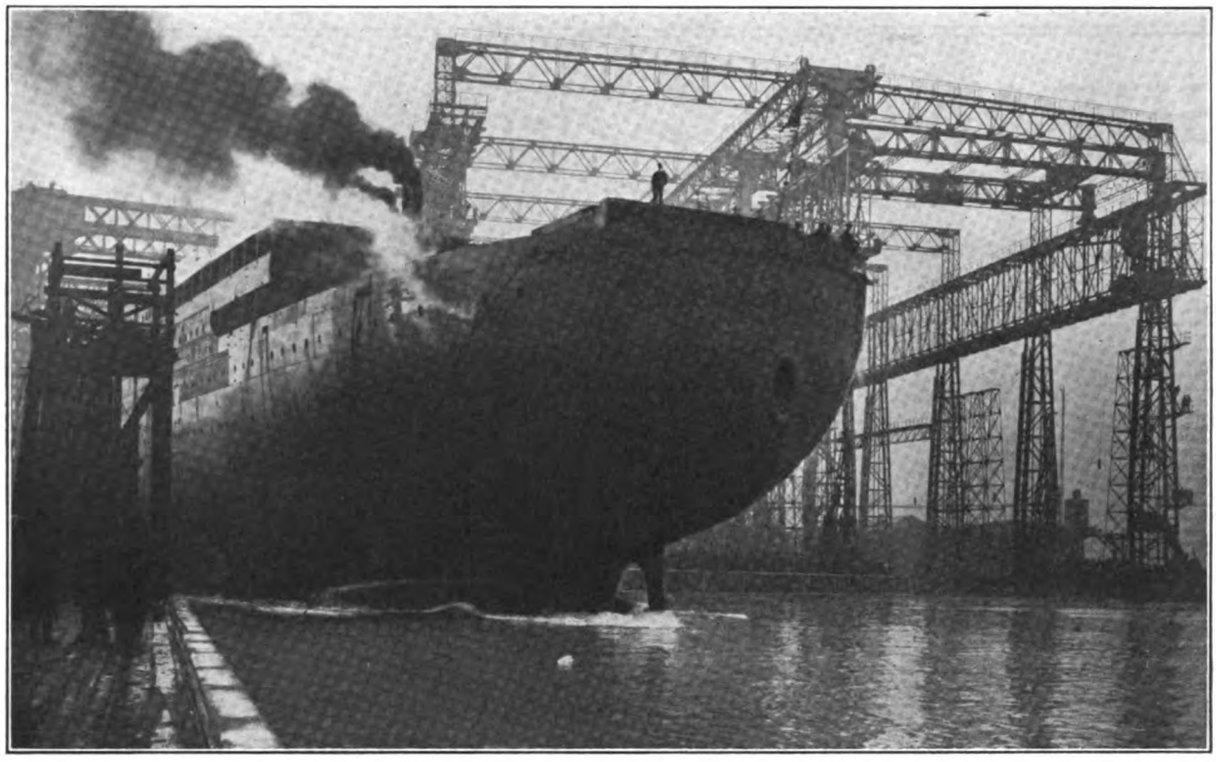
The latest large vessel to enter the trans-Atlantic passenger service was the "Tuscania," sister ship to the "Transylvania." This craft sailed from New York on February 13, on her first return trip. She was built by Messrs. Alexander Stephen and Sons, Limited, of Linthouse, Govan. Her sister ship, which has been chartered by the Cunard Line, was described in a previous issue of the "Pacific Marine Review."

The Long Island Railroad Company has directed that all its ferries and tugs shall be converted into oil burners. The saving thus affected is expected to reach $75,000 a year. The "Metapan," of the United Fruit Company's fleet, is now operating with White's patent oil burners and should the data obtained prove satisfactory to the owners their entire fleet will be changed over to oil burners.

The Harland & Hollingsworth Corporation of Wilmington, Delaware, are to build a steel passenger steamer for the Baltimore, Chesapeake & Atlantic and Delaware & Virginia Railway. The new craft is to take the place of the "Maryland," recently destroyed by fire.

The American Shipbuilding Company of Cleveland, Ohio, has begun work on a fleet of auxiliary barges to be operated in the grain trade from the Great Lakes to the Atlantic coast.

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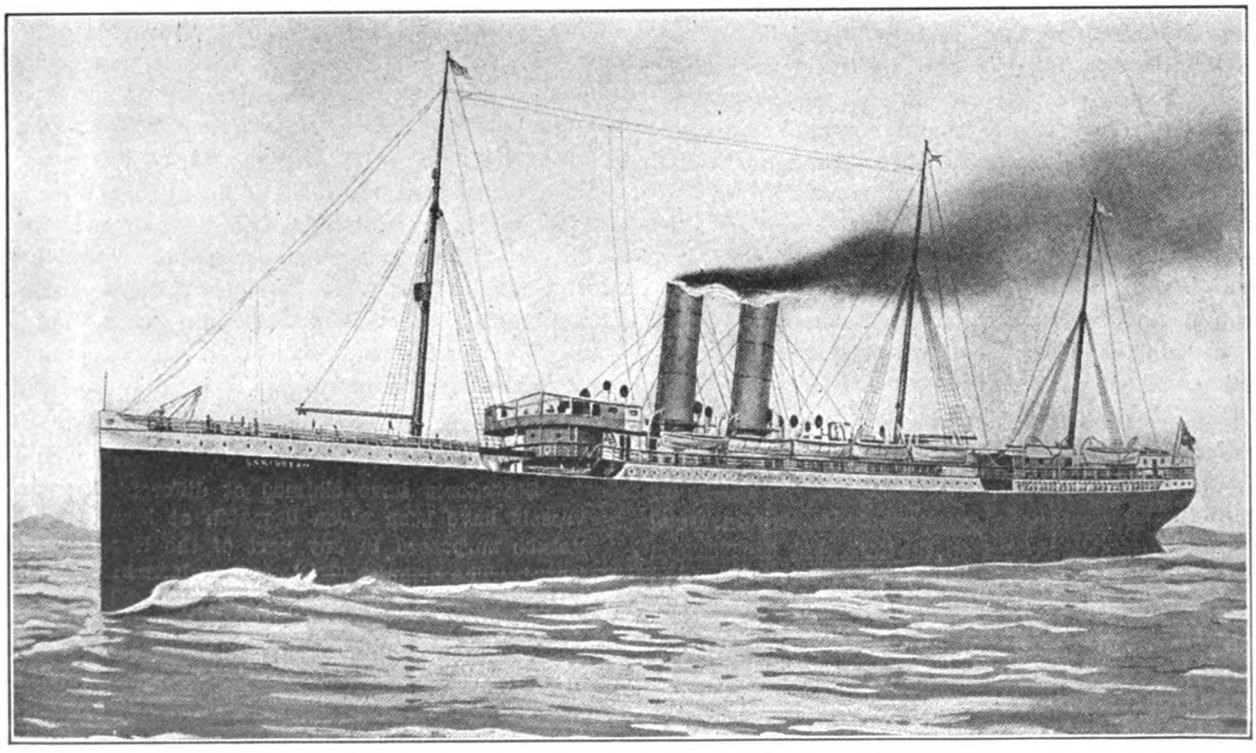


The launch of the "Belgenland," a great new steamer for the Red Star fleet.

Captain Walter, R. N., late commander of the British sloop of war "Sheerwater," both the ship and her master being widely known up and down the Pacific Coast, has been appointed to the command of the auxiliary cruiser "Caribbean." The "Caribbean" is one of the Pacific Steam Navigation Company's fleet and was recently taken over by the British Government and outfitted with six 6" guns.

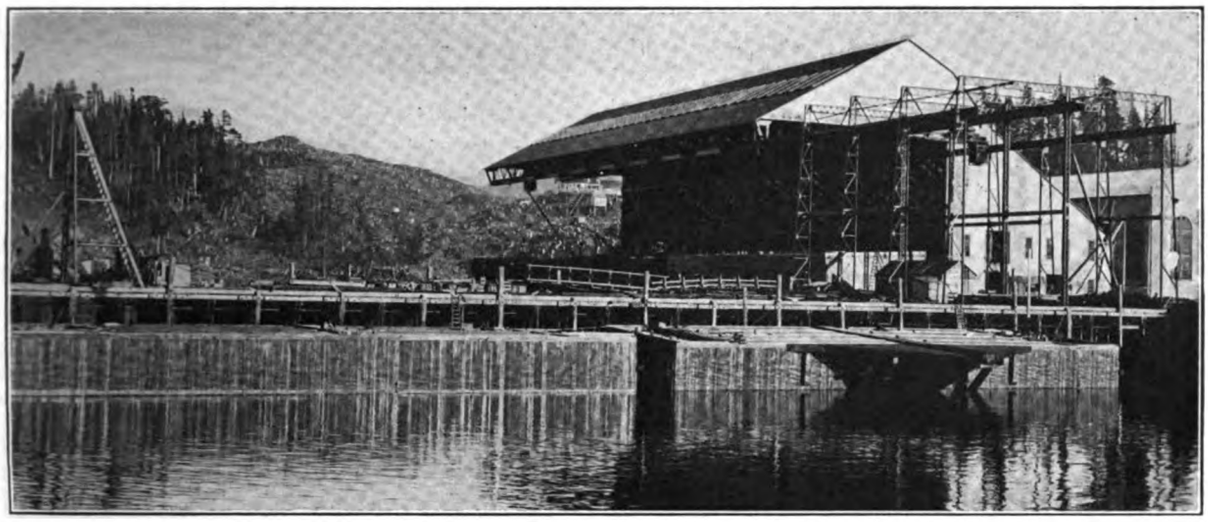
The Craig Shipbuilding Company of Long Beach completed important alterations on the steamer "Navajo." A steel weather deck was installed and other alterations calculated to better fit the lumber carrier for the cotton trade from Galveston to Europe.

The torpedo boat destroyer "Winslow" was launched at the Cramps shipyard, Philadelphia, on February 11th.



The "Caribbean," of the Pacific Steam Navigation Company fleet, now an auxiliary cruiser.

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The unusual ship shed of the Prince Rupert Yard of the Grand Trunk Pacific Railroad.

A Novel Ship Shed

The illustrations herewith show a very striking and unusual structure erected in connection with the dry dock and repair plant at Prince Rupert, B. C., for the Grand Trunk Pacific Railroad.

While the climate at Prince Rupert is mild to such a degree that it is possible to do outdoor work all the year round, there is so much rain that it is most desirable to work under cover, and the building illustrated has been designed and constructed to meet these conditions.

The building is 300 feet long by 160 feet wide. The entire weight of the structure is carried on the center line of foundations. One-half of the roof is carried as an overhang and besides supporting its own weight carries two ten-ton overhead traveling cranes. It will be noticed that at one end of the building there is a steel lattice work constructed to carry these cranes beyond the building proper for the purpose of taking material direct from the cars or from the wharf and placing it upon the work under construction.

The flooring under the overhanging portion is carried on very heavy piling. The outer forty feet slopes two and a quarter inches to the foot and serves as launching ways for side launching of vessels. When completed there is a clear height under the overhead cranes of sixty-five feet and a clear length under cover of three hundred feet. This building was primarily designed and is now being used for the building of twelve pontoons for the 20,000 tons floating drydock. Six of these pontoons have been completed and launched and three more are now being constructed under the shed.

The covered-in portion of the building in the rear of the building berth is used for wood working tools and is equipped with the very largest and most up-to-date wood working machinery.

An upper floor over this portion is 300 feet long by 80 feet wide in the clear, without supports, giving a very fine floor for laying out ships.

The center line of columns on 33′ 4″ centers are carried on concrete foundations, some of which go to rock while others are carried on piles. To guard against the possible yielding of any single foundation, a vertical truss was worked in connecting these columns of sufficient strength to distribute the weight from any single foundation to the two adjoining.

Very heavy wind bracing was introduced to resist unusually severe weather conditions. The weight of the overhanging portion with the addition of the load made it necessary to provide heavy concrete bases for the rear columns, or in other words, under extreme conditions more than the total weight of the building is carried on the center foundations.

While side launching as provided for by this construction is unusual on the Pacific Coast, it is the rule on the Great Lakes and has been introduced at Los Angeles by a shipbuilder coming from the Great Lakes. The design of this building originated with Mr. Frank E. Kirby, well known to the shipping fraternity on the Great Lakes.

The above photograph shows how the building is now being utilized for building pontoons, and it has now been in use a sufficient time to fully test and demonstrate the utility and practicability of the general plan.

The work of wood boring and driving bolts is performed with compressed air furnished from another part of the plant.

The twelve pontoons which are to provide the lifting power for the 20,000 ton dock will contain four million feet of lumber, and with the tool facilities and advantages of the overhead traveling crane, it is possible to launch one of these pontoons every month.

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General Average

TO those who are familiar with the laws governing General Average it is well known that the sacrifice of any one party to the sea venture for the benefit of all parties to the same venture must be made good by the contribution of all, but that damage done to a third party entirely outside of the venture, and that to shore property, must be made good in the same way has but recently been the subject of litigation and has received judicial recognition. The case arose in England and was decided in the London Commercial Court.

It appears that the steamer "Winchester" was bound for Sharpness docks with a cargo of corn. While proceeding up the Severn she grounded but was floated and was carried by the strong tide above the entrance to the docks where she again grounded and received considerable damage. She was floated with the assistance of tugs and it was the intention to take her down the river and place her on the bank, presumably with the intention of making temporary repairs in order that the cargo might be discharged in the usual way. After proceeding a short distance it was found that she was leaking badly and was liable to sink, and the Master and Pilot then determined for the general safety to take her into dock. To get her there it was necessary to pass between two piers. The tide was running strong ebb. She had no steam of her own, the tugs were apparently unable to hold her against the tide and there was grave danger that she would hit the lower pier when trying to make the entrance. In fact the pilot testified that it was his intention to hit the pier "in order to take the reach off her." The steamer struck the pier, harder than was intended, damaged herself thereby to the extent of about $8000 and the pier about $25,000. Claim was made in general average for these damages but was resisted by the underwriters interested, and litigation followed.

In giving his decision Mr. Justice Bailhache said:

"Mr. Lowndes (Lowndes on General Average) cites a passage from Ulrich as follows: 'General Average not only comprises the damage purposely done to the ship and cargo, but also (1) all damage or expense which was to be foreseen as the natural (immediate) consequence of the first sacrifice, since this unmistakably forms part of that which was given for the common safety. (2) All damage or expense which though not to be foreseen, stands to the sacrifice in the relation of effect to cause, or, in other words, was its necessary consequence.'

"Following these guides it is clear upon the facts that the damage to the steamer and to the pier both fall within the statutory definition of general average loss. This disposes of the right to contribution in respect of the damage to the steamer and would dispose of the right to contribution in respect to the damage to the pier; but, strangely enough, there is no decision to be found upon the point whether general average expenditure includes the making good of damage done to the property of some third person. In principle, in such a case as this, it clearly does. . . . If I turn to Ulrich, the collision with the pier was a foreseen result, and not the result of a subsequent accident.

"In my judgment the position is this: The Master of a ship has implied authority when occasion arises for a general average act to do whatever is necessary and prudent for the preservation of ship and cargo, even if this involves committing a trespass and that there is the further implied obligation on the part of the cargo owner and shipowner to bear between them in their respective proportions the consequence of every such necessary or prudent act."

Judgment was given for the plaintiff and a stay of execution pending an appeal was denied.

It is rather a curious coincident that at the time this judgment was given a similar question was up for consideration before the underwriters in this city. Some two years ago a Pacific Mail steamer was aground in the harbor of Nagasaki. Her keel was on the bottom some twenty or thirty feet away from a sea wall on which was an iron works plant and other structures. The Master realized that if the steamer remained on the ground during the following ebb tide serious damage might result to both ship and cargo, and he kept the propeller going ahead at full speed in order to free her. The back wash from the propeller disturbed the sandy bottom of the harbor and while he knew that some damage would undoubtedly be done to the sea wall yet he concluded to risk that rather than to allow the venture of which he was in command to be placed in a position of greater peril. The steamer was floated without damage to herself or cargo but the result of the action of the propeller was that a part of the sea wall collapsed and the structures thereon and other property suffered damage. The Master had committed a trespass, for the results of which the owners of the ship were compelled to pay, but as the trespass was committed for the good of all concerned in the venture, the ship and cargo, these interests must, following the fundamental principles of general average, contribute to that damage.

The Pacific Mail Steamship Company's Panama steamer, the "Aztec," has just completed extensive overhauling at the Union Iron Works and is once more on her southern run.

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DANGERS TO NAVIGATION IN ALASKA.

The startling information that 21 dangerous pinnacle rocks in 42 miles of ship channel had been discovered in Alaska during last season by Field Engineer John A. Daniels of the Coast and Geodetic Survey has been made public by Secretary of Commerce Redfield.

These rocks were located by means of a wire drag more than a mile long, the wire being supported at the desired depths by cables to surface buoys and towed along by power boats.

The ship channels covered by the wire-drag survey are located in southeastern Alaska. They form a section of the well-known inside passage followed by all steamers going up and down the coast. The main thoroughfares included in the survey operations were Revillagigedo Channel, Nichols Passage, and Tongass Narrows.

The rock walls of the channels of this part of Alaska are nearly straight up and down, both above and below the level of the water. Depths from 20 to 100 fathoms are within 100 yards of shore. Yet it was in these waters the 21 dangerous pinnacles were discovered.

One of these rocks is of pyramid shape and rises over 600 feet from the bottom of the channel to within 17 feet of the surface. It is surrounded by deep water on all sides and is now located on the chart where a 109-fathom sounding was formerly recorded. Field Engineer Daniels speaks of this 600-foot pramid as a sort of a submerged Washington monument. He says that if the lead struck it in the old survey it probably slipped off into the deep water of 109 fathoms alongside. But he thinks it is more probably that it came in between two soundings and was missed altogether.

The net result of the survey operations is covered by the statement that 42 miles of ship channel having 21 dangers hitherto unknown and uncharted are now completely surveyed and made safe for navigation, a large result from comparatively small operations. The entire field season of the wire-drag survey was included within three months. Out of these the number of working days was 48. The area covered by the wire drag was 60 square miles. The cost for each danger discovered was $675. The cost of the wreck of the "State of California" was 31 lives and $300,000. Figured on a money basis, this wreck alone would pay for the location of over 400 pinnacle rocks or would run a wire-drag party for 20 field seasons of 3 months each.

This resurvey does not mean that the old surveys of this locality were poorly executed. On the contrary, they are among the best of their kind in Alaska. It is merely a question of progress; of old methods versus new methods. If the wire-drag had been in use at the time of the old survey there would have been 25 pinnacle rocks to report in this locality instead of the 21 mentioned, the other four being the Ohio Rock, Idaho Rock, Potter Rock, and the California Rock, all previously made known to navigation by ships of corresponding names having been wrecked or damaged by them.

There can be no question about the great value and importance of the discovery of the pinnacle rocks reported by Field Engineer Daniels. It is true that a number of shipping accidents in the locality just surveyed by him indicated the existence of other dangerous rocks not yet discovered and named in honor of ships wrecked upon them. Yet when it is reported that there are 21 such pinnacle rocks in one 42-mile section of the ship channel, the shipping interests of Alaska are likely to be even more worried than they were before they knew the facts now made public.

The dangers discovered have already been placed on new editions of Coast and Geodetic Survey charts and the more important ones will be buoyed by the Lighthouse Service. So it is not the 42 miles of ship channel already covered by wire-drag surveys which will worry the ship captains and shipowners. What they will worry about more than ever is the hundreds of miles of ship channel which have not been so surveyed.

MARINE MISHAPS.

"CITY OF PANAMA." The old steamer was recently converted into a coal barge and located in Mission Bay. During a southeaster on February 2nd, she sprung a leak and sank at her moorings. The vessel and several hundred tons of coal aboard were the property of the Rolph Navigation Company.

"DEFENDER." The schooner "Defender" went ashore on the lee side of Lanai Island and became a total loss. The "Defender" is the property of Hind, Rolph & Company of San Francisco and was on her way to the port of Hana to take on a cargo of sugar.

"DELHI"—Went aground in Sumner Strait, Alaska, January 18. The crew of the little wooden steamer was taken off by the "Alameda." The "Delhi" was built at Winslow, Washington, in 1906, and had been on the Alaska runs for several years.

"DEFENDER," schooner. Ashore on island of Maui, February 1st. Gotten off February 2nd and towed to Honolulu.

"NORTHLAND." Steamer en route from Portland to San Francisco had rudder disabled in heavy seas, too rough to rig jury rudder. Towed by steamer "Nann Smith" and later

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proceeded to San Francisco under her own steam.

"TRANSIT." Tug belonging to the Union Oil Company sunk while lying alongside the south side of Pier No. 32, on February 7th. Cause of disaster, heavy seas.

"DELHI." Steamer, Seattle, Feb. 16—Salving of the steamer "Delhi" by gas schooner "Taku II" confirmed; was towed to bight in Sumner Island and lying in protected place; vessel intact and engines uninjured and salvage gear on board safe.

"SAN JOSE." Steamer, Capt. Jones, from Panama Jan. 27 for San Francisco, was towed into Acapulco Tuesday morning (Feb. 16), 4 a. m., by U. S. steamer "New Orleans"; vessel became disabled between Salina Cruz and Acapulco; S. O. S. calls were sent out Sunday night.

"ST. HELENS." Steamer, Panama, Feb. 14.—A collision occurred on Dec. 30 off Cape San Lucas between the steamer "St. Helens," from Salaverry for New York, and steamer "Wm. Chatham," from Nitrate Port for Norfolk; the "St. Helens" had two plates buckled, frames and forecastle bulkhead buckled and twisted.

"WM. CHATHAM." Steamer—See "St. Helens."

H. E. MOSS & COMPANY ISSUE SEMI-ANNUAL STEAMSHIP CIRCULAR.

In view of conditions in Europe the semi-annual Steamship Circular of H. E. Moss and Company, large ship brokers, is of special interest at this time. Their foreword is reproduced below:

When we issued our last semi-annual Steamship Circular, on July 1st, 1914, few shipowners or others contemplated we were on the eve of the greatest crisis the world has ever seen, yet apparently in diplomatic circles it was not entirely unexpected. Nevertheless, what has happened occurred at the psychological moment and we have much to be thankful for.

The outbreak of hostilities coming so suddenly, a world-wide financial panic was averted by the prompt action of our Government, to whose forethought and promptitude we owe so much. Then, the Shipping insurance scheme so quickly inaugurated inspired all shipowners with confidence. We must not, however, forget how much we are indebted to our Admiralty, who have done their part so quietly and so thoroughly.

With so much uncertainty existing early in August, a slump in freights and values of steamers naturally occurred, and for two months it was scarcely possible to obtain a bid, and prices for building were practically as low as they have been for a long time past. Since then, however, there has been a very great change. Most of the shipyards are full to overflowing, freights have advanced in many instances over 100 per cent., and those shipowners whose steamers are not tied up are reaping profits never before experienced. What every one connected with shipping now asks, is: "How long will this war last? and what will be the result afterwards?" To the latter question our opinion is there may be at first a set-back; but not long afterwards Steamship Owners in general will be benefited.

At the present moment most of our shipyards have sufficient orders to last them well into 1916, and few builders can give early delivery. Prices for building have advanced in six months from 10 to 20 per cent. and what new steamers were building on speculation have been nearly all disposed of. Second-hand tonnage is difficult to obtain except at extreme prices, and large profits have been quietly realized. The amount of tonnage under construction on January 1st, 1915, will, we anticipate, be greater than it has ever been before, and well above 2,000,000 tons.

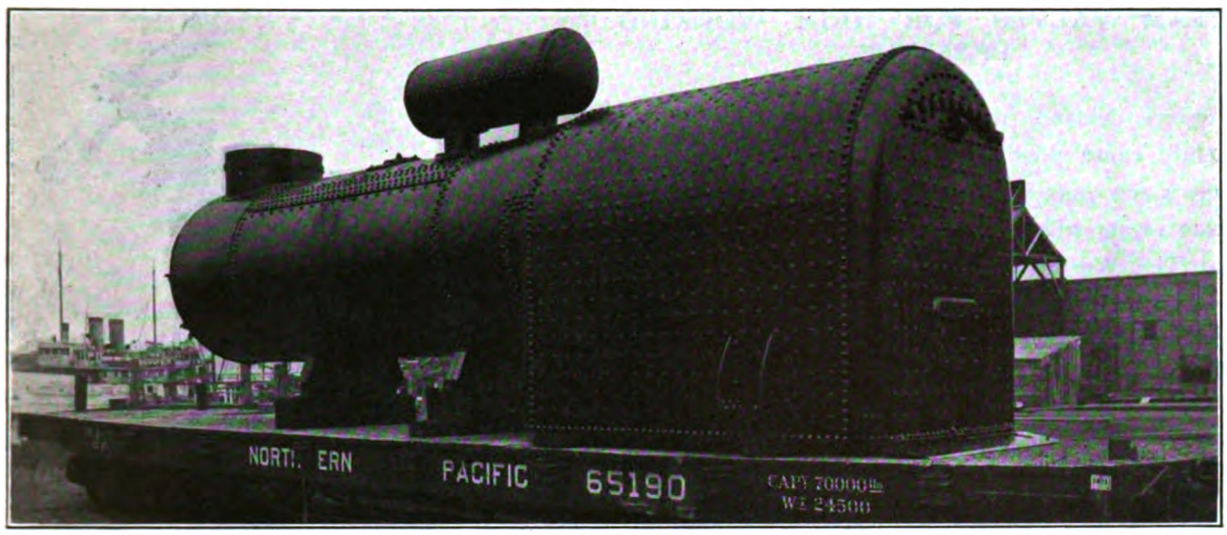
Our Board of Trade returns, notwithstanding the terrible ordeal through which we are passing, are steadily increasing, which bids well for the future, and is a sure indication that every Britisher is convinced of the only way this lamentable war can end, cost what it may and however long it may last.

The Elliott Bay Dry Dock Company of Seattle, has been kept quite busy during February. Among the vessels docked were: S. S. "Dart," cleaning and painting; Halibut schooner "Victor & Effin," general repairs to her hull and engine: S. S. "Chinook," cleaning and painting and repairing tail shaft; S. S. "City of Angeles," cleaning and painting, renewing guard, renewing stem and stem iron; S. S. "Virginia II," straightening propeller blades; S. S. "Kingston," straightening rudder; United States Harbor Boat "Major Evan Thomas," cleaning, painting and general repairs to engine; S. S. "Giant II," cleaning and painting; tug "C. C. Cherry," cleaning and painting; S. S. "Athlon," cleaning and painting, repairs to zinc plates, rudder and stern post.

Officials of the Pacific Coast Steamship Company at Seattle have announced that a steamer especially fitted for the northern cannery trade will be acquired at once to take the place of the S. S. "Delhi," which was wrecked on Sumner Strait, Alaska, some time ago. Several vessels are being considered.

The United States cable ship "Burnside" is at present engaged in repairing the break in the Alaska cable, which occurred between Sitka and Juneau.

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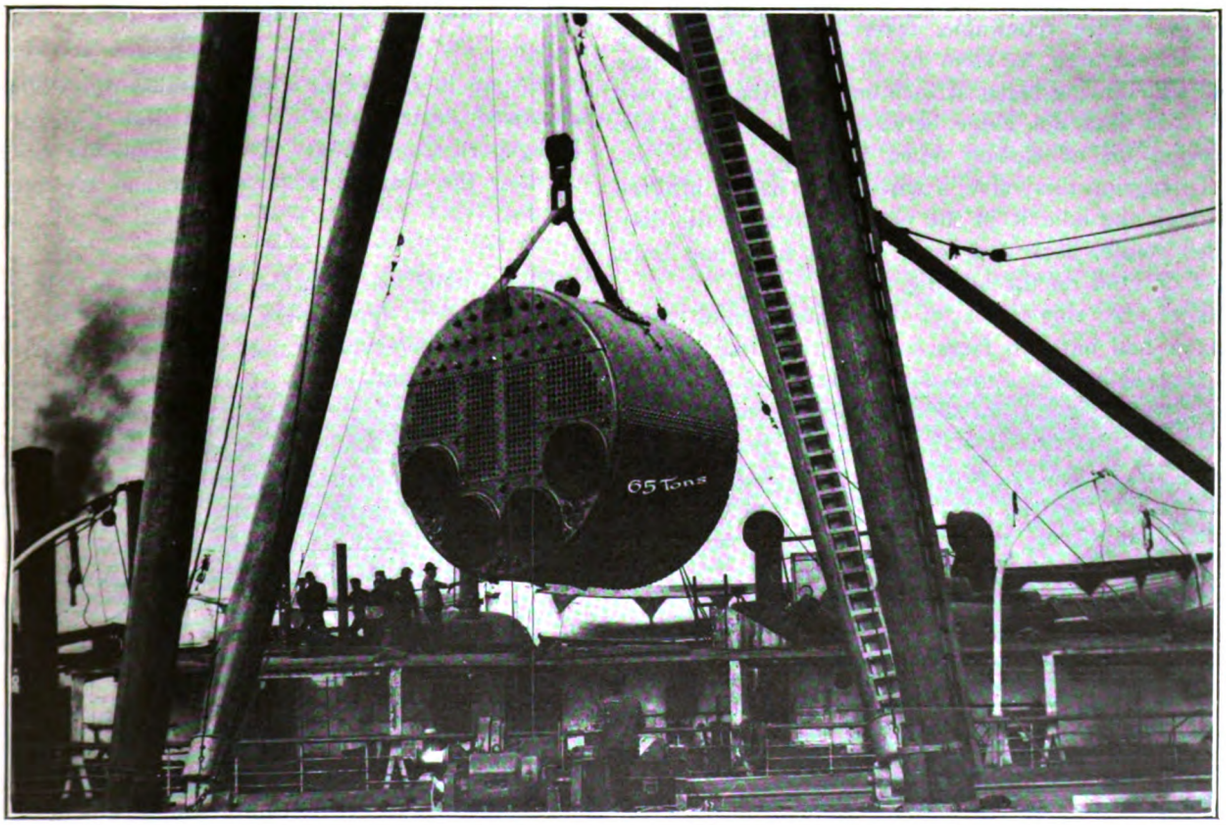


Locomotive marine boiler for the fisheries steamer "W. H. Bancroft."

With Those Who Do Things

The interesting illustration below depicts a new boiler under the shear legs at the plant of the Commercial Boiler Works, Seattle. The boiler is being placed upon the steamship "Pennsylvania." The shear legs themselves are of special interest as they were probably the first in this country to be electrically operated. They are operated by a Lambert electric hoist which has a 40-horsepower, 220-volt direct-current motor designed to lift 80 tons at a rate of 10 feet per minute.

The locomotive marine boiler, pictured herewith, is one that was built by the Commercial Boiler Works for the Northwestern Fisheries Company's steamer "W. H. Bancroft," and is of the following dimensions: Shell at inner course 72″ in diameter, length 24′ 0″ without smoke box extension; firebox 9′ 6″ long, 72″ wide and 6′ 7″ deep. There are 127-3½″ by 14′ 0″ tubes. This boiler was built to pass the U. S. Marine Inspection for 200 pounds working pressure.



A large boiler being slung into place at Messrs. Fox & Jenkins' Commercial Boiler Works, Seattle. Note the simplicity of the sling.

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STEAM VALVES FOR HIGH WORKING PRESSURE.

Severe demands made upon blow-off valves frequently cause them to break down or leak badly after a few months, hence owners and operators of steam plants will be interested in the announcement that The Wm. Powell Co., Cincinnati, O., after a long series of experiments, has produced an exceedingly durable valve, known as the Powell "Y" blow-off valve.

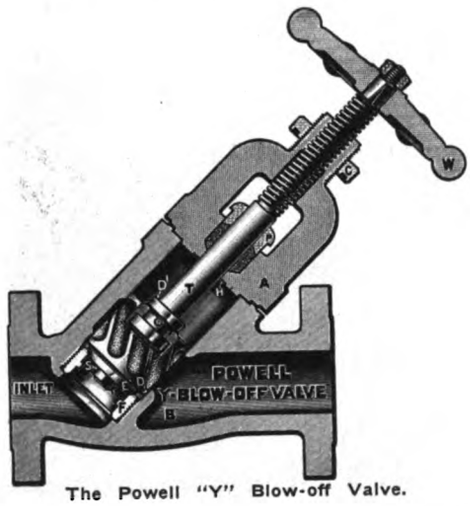
The illustration given herewith shows clearly the improvements that have been made.

The yoke top A is secured to the body B by studs. Packing is secured and regulated by the pusher gland P, which is operated by the outside screw nut C above the bridge of the yoke, a construction which enables the engineer to adjust the pressure at any time with an ordinary monkey-wrench, and eliminate the danger of accident when the packing has to be renewed. Faces D and H, fitting tight, permit the valve to be repacked under pressure when wide open. The plunger D is of brass, milled to receive the collar on stem T, and has spiral grooves cast on the outer face, which receive the steam pressure as the valve is opened and cause it to revolve as it nears the seat when closing, keeping both disc and seat clean of scale and sediment. The seat ring F has been lowered to protect it from the cutting effect of the rushing steam as the valve is opened. To the plunger is attached the Powellium White Bronze renewable, reversible and regrinding disc E, secured to stem by disc nut S, disc face and seat bearing being at such an angle that sediment or scale does not lodge between them, either while blowing off or closing down the disc.

To regrind this valve, a wire pin or nail is inserted through the hole R in the plunger, locking the disc. Then rotate, back and forth with a little fine brick dust or sand on the bearing.

The seat ring F is of Powellium white steam bronze and has two faces so that when one is worn it may be readily removed and reversed by means of lugs cast in the throat of the ring, this construction and the special metal for disc and seat insuring long life, and the withstanding of 2000 deg. F. The entire valve is very heavy, well proportioned, and of excellent workmanship. These valves are made in 2, 2½ and 3 in. sizes, with screwed or flanged ends. Each valve is tested to 250 lb. hydraulic pressure and is guaranteed to stand the severe service to which it may be subjected.

The lifeboats of the transpacific liner "Shinyo Maru" were recently equipped with Rouse patent sea anchors, a device which is meeting with much favor from shipowners.



The Powell "Y" Blow-off Valve.

Our cover design this month is from a photograph kindly loaned us by Curtis and Miller, commercial photographers of Seattle, Washington. The photograph is one of the best "seagull" pictures we have seen and speaks volumes for the artist who secured it.

The Von Hoveling American Composition Company Ltd., altered their business name on the first of February to The Federal Composition and Paint Company, Ltd. The business will be conducted under the same management as heretofore and the headquarters remain at 17 Battery Place, New York. The products of the firm will be manufactured under the same process as formerly, namely the Von Hoveling process.

We are in receipt of a new catalog describing the improved draft gauge of the McNab Company of Bridgeport, Connecticut. These gauges are designed to show the draft of a vessel fore and aft and also her list.

The Union Gas Engine Company has been receiving quite a few orders lately for 12, 16 and 20 horsepower two-cylinder gas engines for Australian and New Zealand use.

One of the handsomest steamship publications we have yet seen is the volume entitled "Official Guide for Shippers and Travelers to the Orient," an exceedingly handsome and well illustrated volume issued by the Osaka Shosen Kaisha, of Osaka, Japan. The color plates are especially fine.

The Terry Steam Turbine Company have appointed Mr. Earl F. Scott their representative for the State of Georgia, with headquarters at 702 Chandler Building, Atlanta. Their Pittsburg office, in charge of Mr. R. A. Rapelye has been moved to 1624 Oliver Building.

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The Seabury Marine Steam Engines for commercial and pleasure craft are illustrated and described in a new folder, No. 11 F, just issued by the Gas Engine & Power Co. and Charles L. Seabury & Co., Morris Heights, New York City. This folder, which is supplementary to the recently issued Stationary & Marine Boiler Catalog, No. 10 F, shows that the Seabury Engines of the reciprocating type are built compound from 12 to 90 H.-P. and 3 cylinder triple expansion in two sizes for vessels of speed, namely 1200 and 2400 H.P.

The folder calls attention to numerous other products of that Company and particularly to the gasoline electric generating sets for regular or emergency lighting, such auxiliary lighting systems by the revised steamship inspection regulations effective July 1, 1915. Copies mailed upon request to the sales-manager, Carlos De Zafra, Chas. L. Seabury Company, Morris Heights, New York.

The Union Gas Engine Company has been supplying a number of four-horsepower motors for lifeboats. Among the steamship companies whose boats have been outfitted lately are the Matson line, the Oceanic Steamship Company and others.

The steamer "Santa Ana" of the Alaska Steamship Company sailed from Seattle on February 12th to take the place of the steamer "Dora." The "Santa Ana," which has been remodeled, will operate on the Alaska Peninsula route.

The United States Engineers' office at Eureka, California, has awarded the contract for supplying a three-cylinder, thirty-horsepower gas engine for the Government launch "Clyde" to the Union Gas Engine Company of San Francisco.

G. W. Wiley, manager of the Pacific Alaska Navigation Company, has terminated his service with the company, and was the recipient, recently, of a beautiful silver loving cup, the gift of the officers of the company's liner "Admiral Farragut."

The United States Engineers' office at Seattle, has recommended the award of a contract for delivering 35,000 tons of stone for jetty work at Lone Tree, Wash., to the Cascade Contracting Company of Portland, for $60,550.

The Grays Harbor Port Commission are installing a new wharf at Hoquiam. The new structure will be 1250 feet long by 150 feet wide, will be furnished with ample spur-track facilities and will be used primarily to facilitate lumber and shingle shipments.

The arrangement between the Craig Shipbuilding Company and the Los Angeles Harbor authorities anent the construction of a semi-municipal dry dock and the movement of the Craig Shipbuilding Company to a location on Smiths Island seem to now be in a fair way of being consummated. The port is very desirous of securing the dry dock and shipbuilding plant, but unavoidable legal delays, due to the disposition of bond funds, has held the project back for some time.

The Seattle Port Commission has decided to erect a four-story headhouse for the West Seattle ferry instead of the original two-story headhouse first designed. The estimated cost is $40,000.

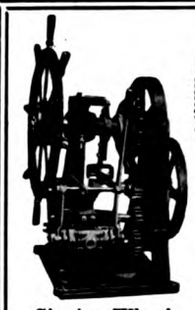
Bids will be received by Maj. J. B. Cavanaugh, Burke Building, Seattle, up to noon March 15, for the construction of a pumping plant for the Lake Washington canal locks.

The Luckenbach Steamship Company has placed an order with the Newport News Shipbuilding Company for a large shelter deck type cargo boat of about 15,000 tons measurement.

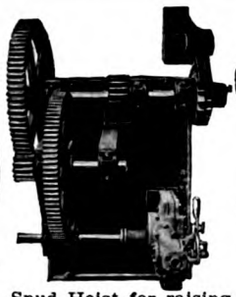
The new steamer building at Newport News for the Luckenbach Steamship Company will be a 425-foot steel freighter and will be named the "Edgar F. Luckenbach."



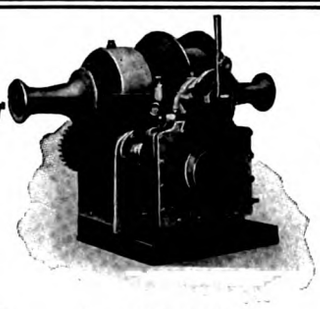
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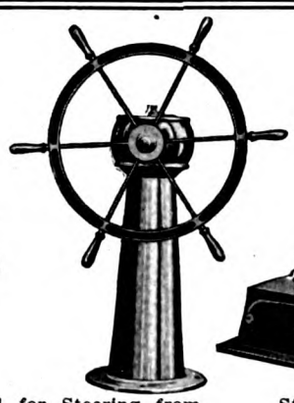
Single Wheel Steam Steering Gear



Spud Hoist for raising and lowering spuds on dredges



Gang Plank Hoist

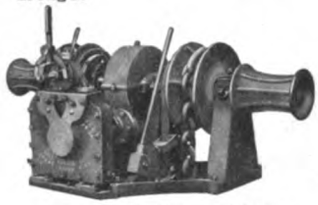


Standard for Steering from top of Pilot House

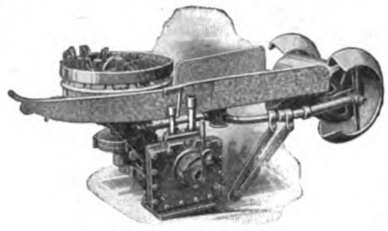


Steam Deck Capstan

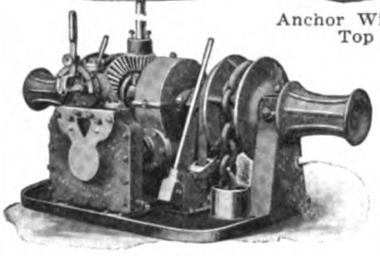




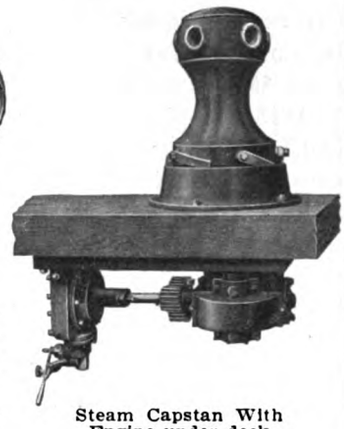
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Steam Net Lifter



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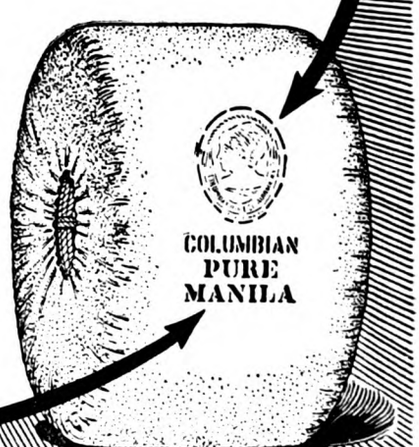
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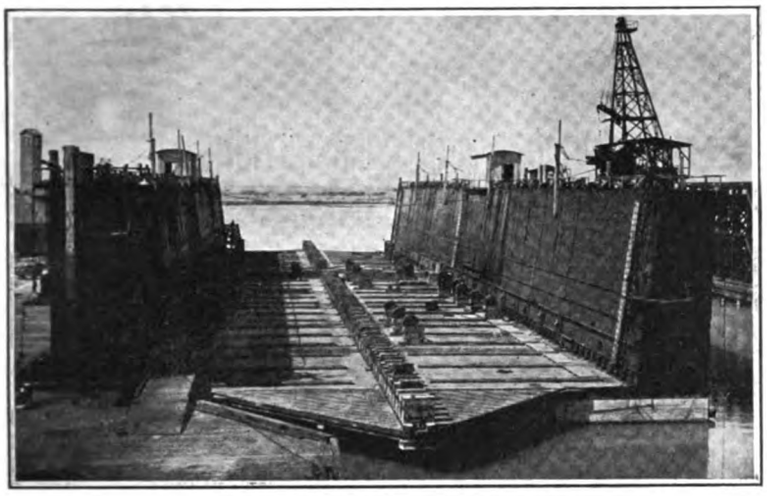
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INTER-ISLAND STEAM NAVIGATION COMPANY, L'td., Proprietors



FLOATING DRY DOCK "HOOLANA"

Length—

over keel blocks.....352' 0"
over wings .....301' 9"

Width—

over all .....100' 0"
between wings, top.... 84' 0"
between wings, bottom. 76' 0"

Draft—

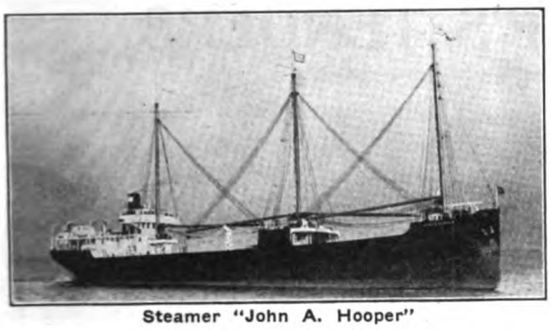
over Keel blocks..... 23' 6"

Lifting capacity .....4500 tons

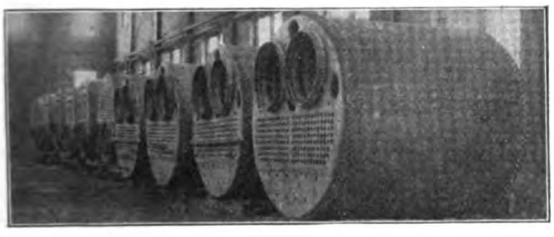
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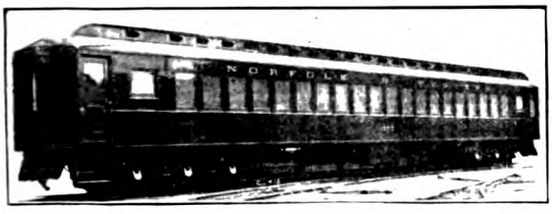
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Steamer "John A. Hooper"





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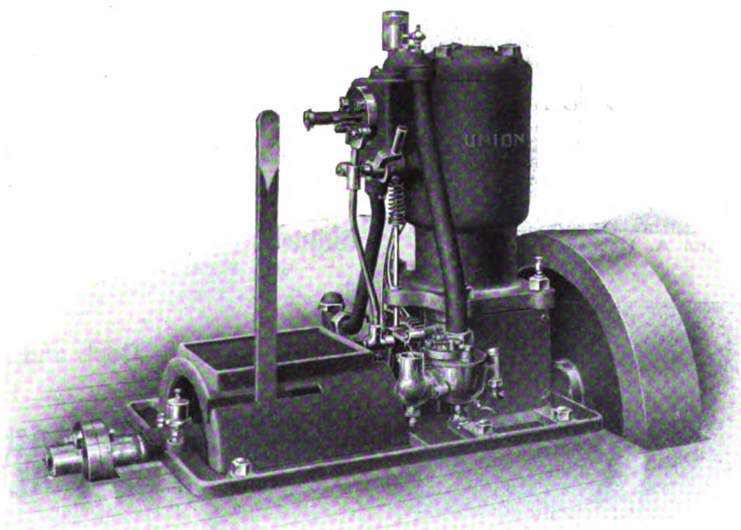
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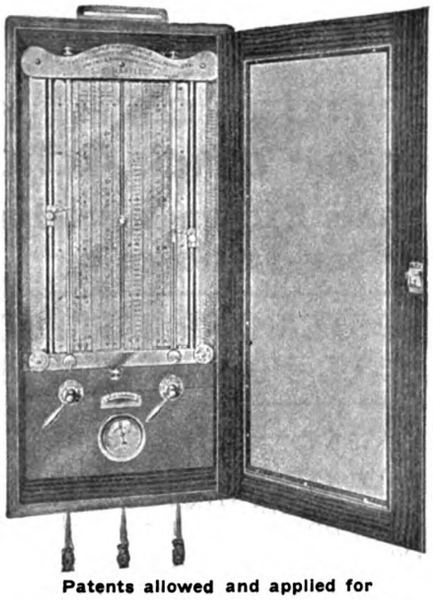
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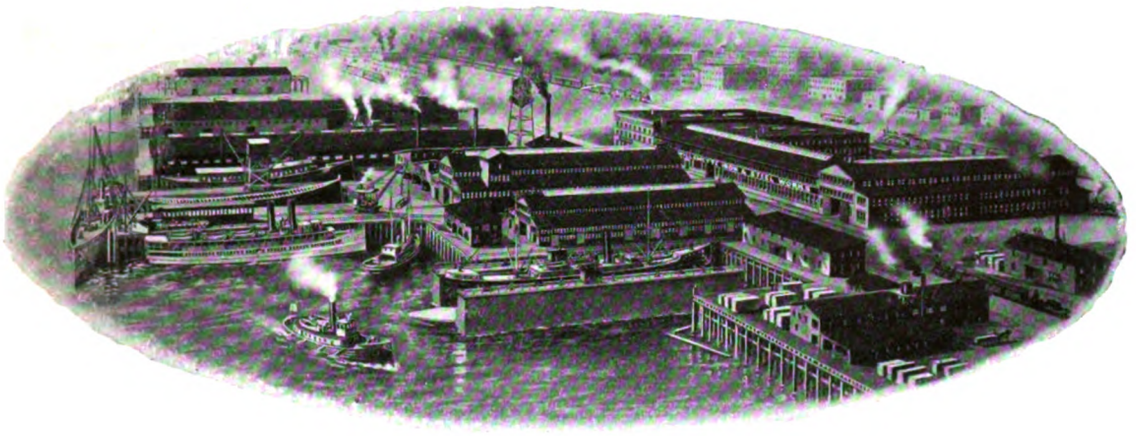
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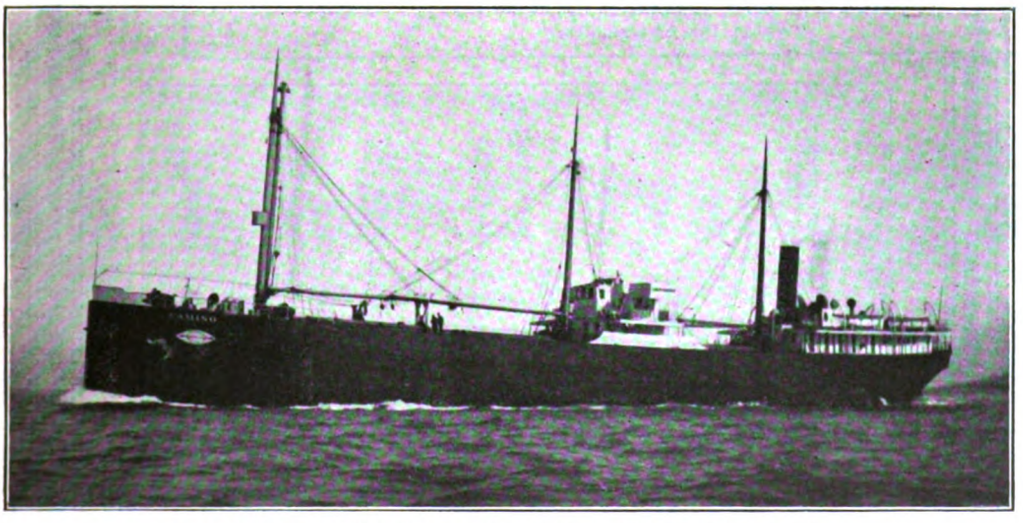
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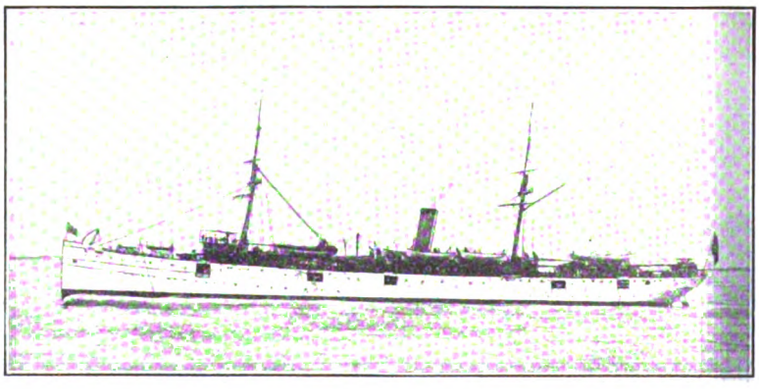


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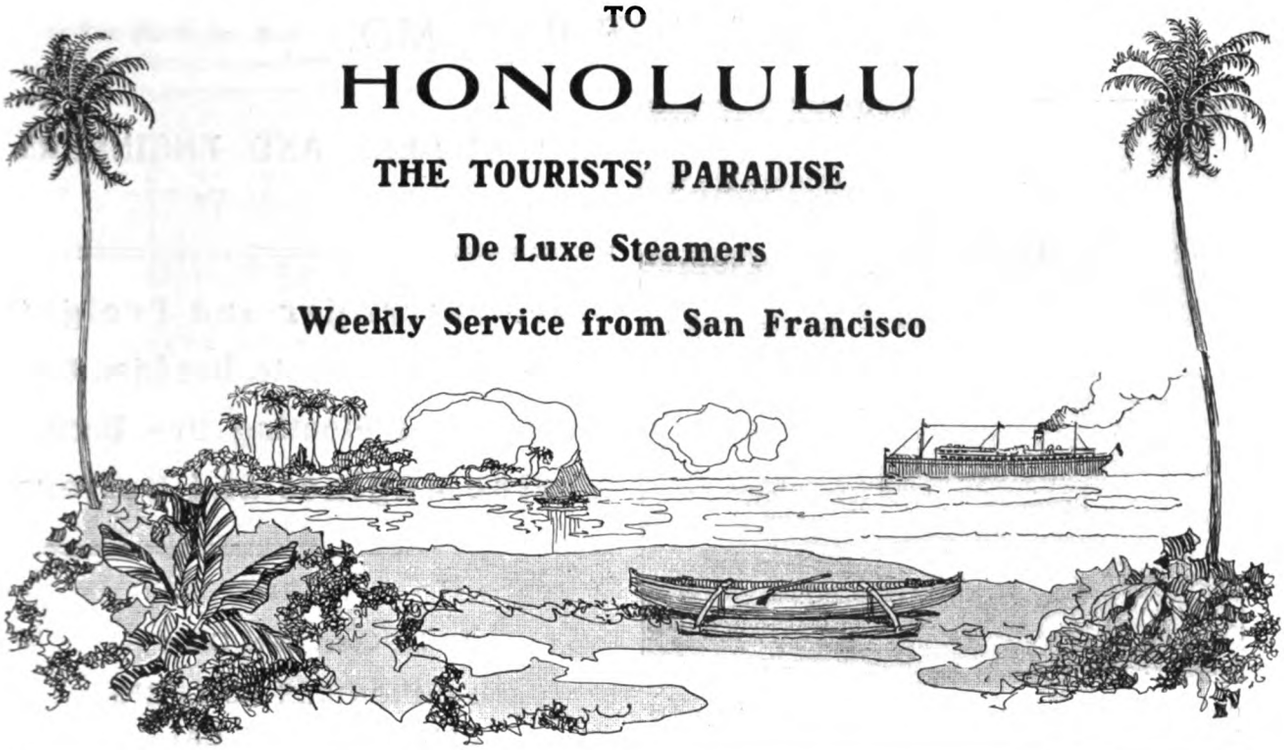
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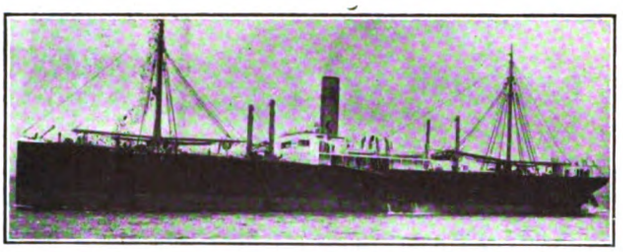
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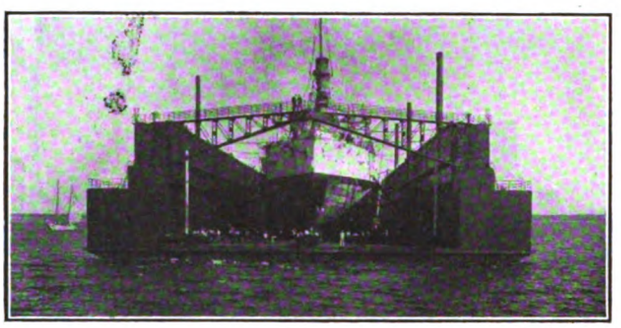
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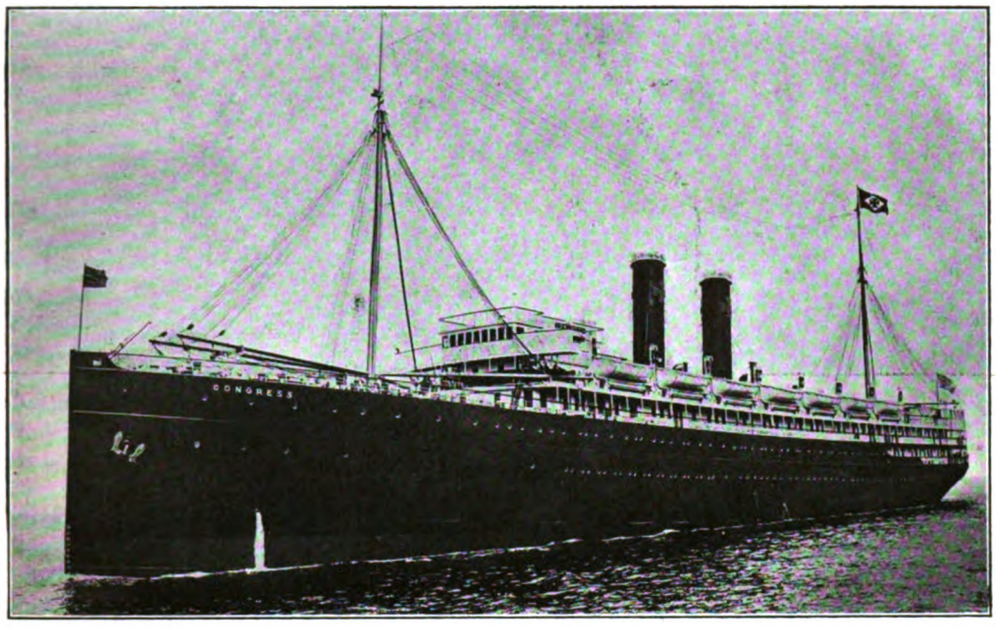
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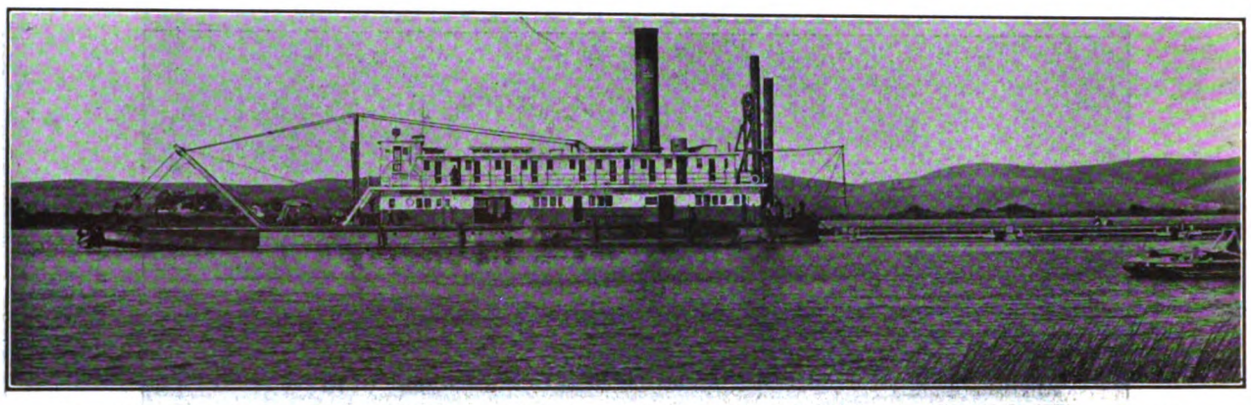
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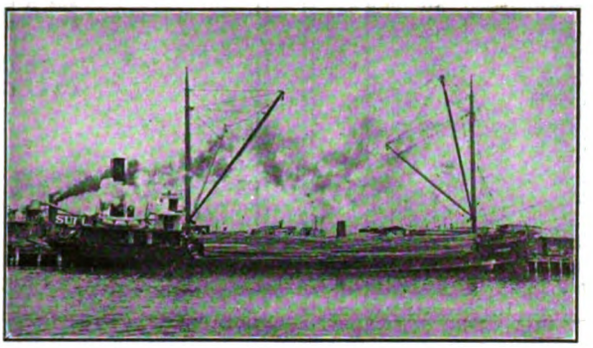
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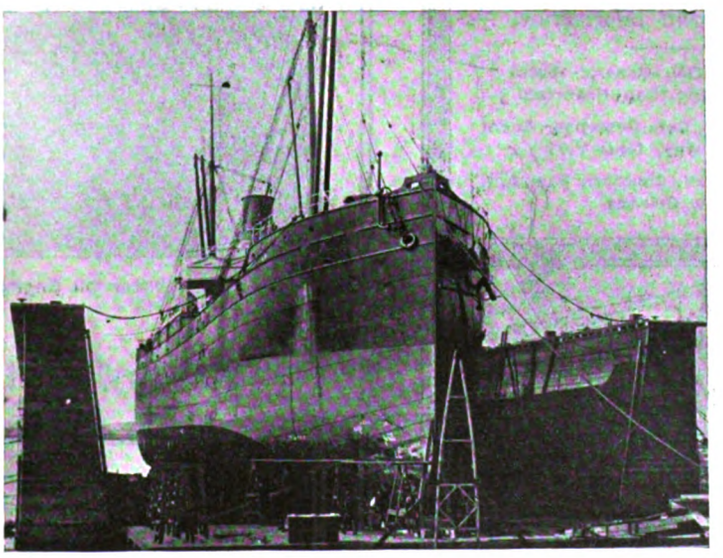
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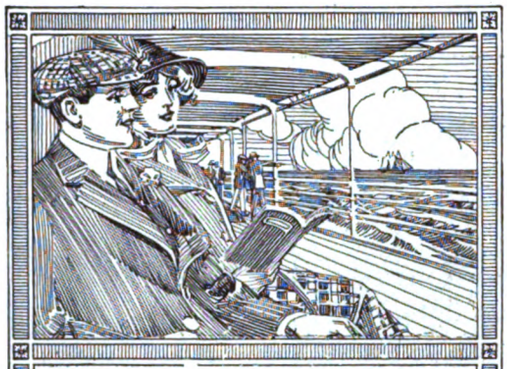
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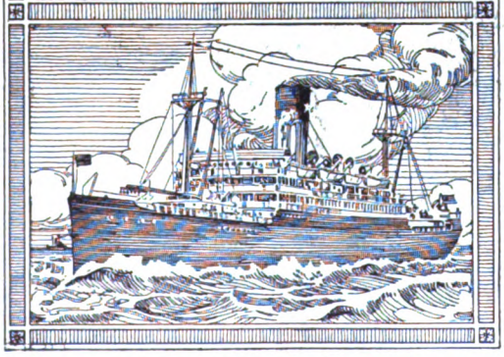
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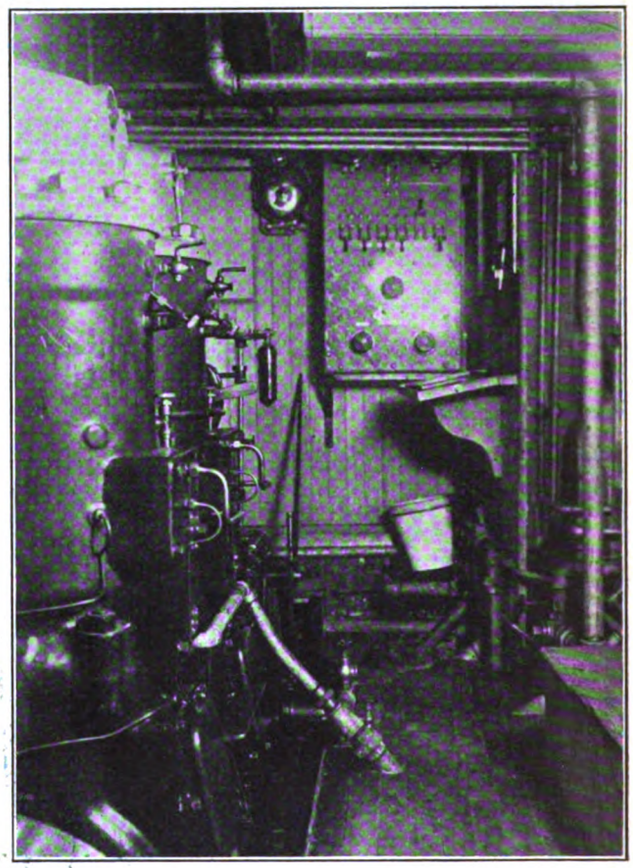
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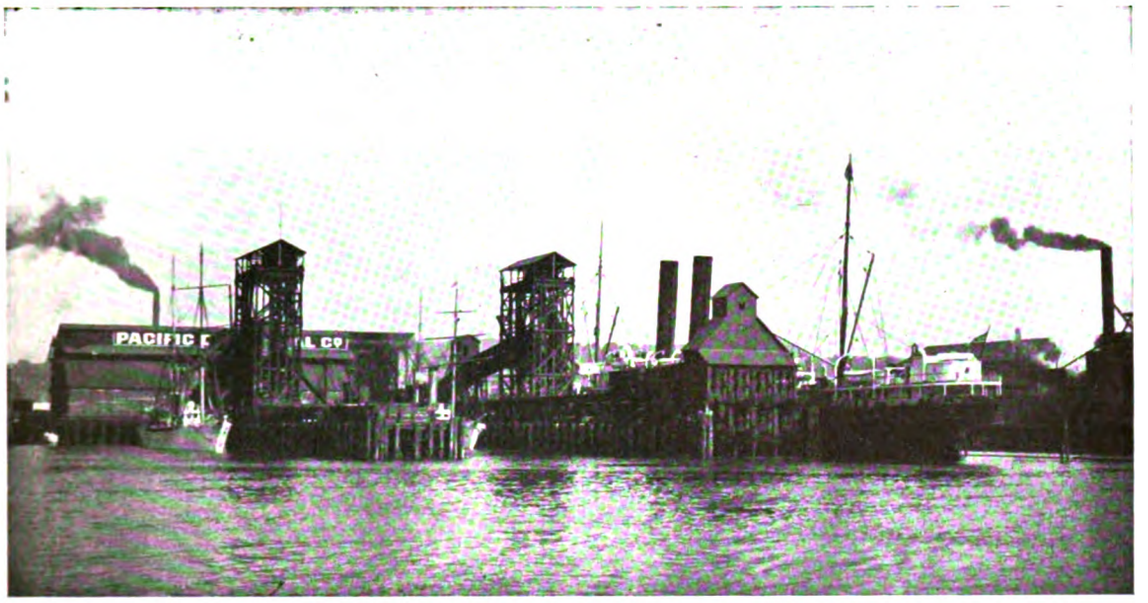
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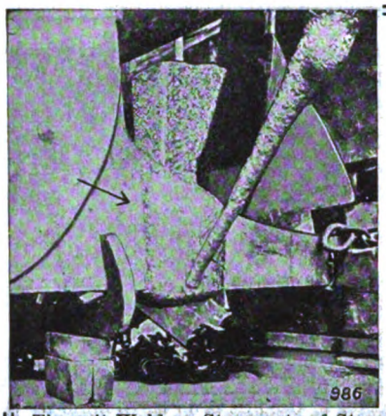
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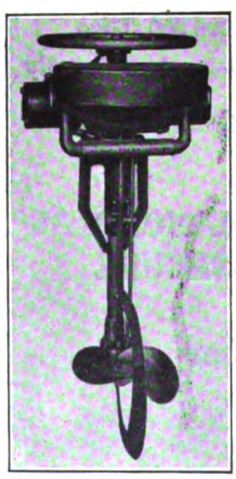
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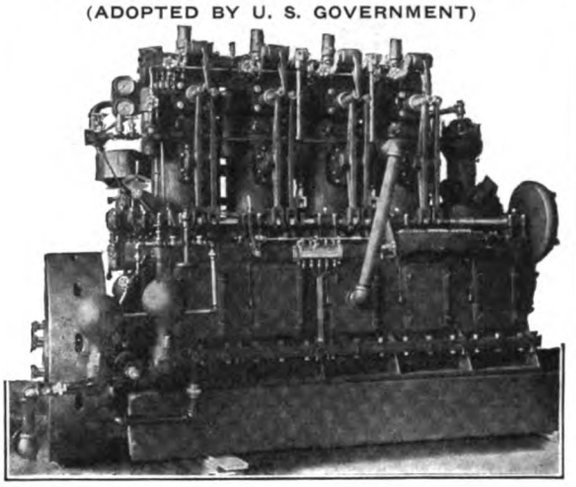
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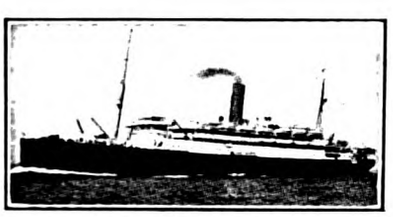
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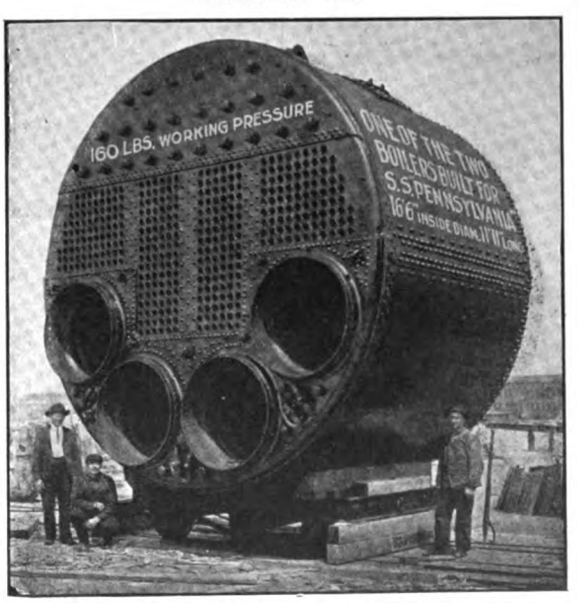
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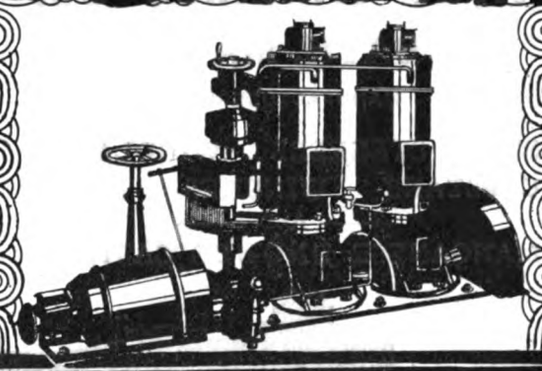
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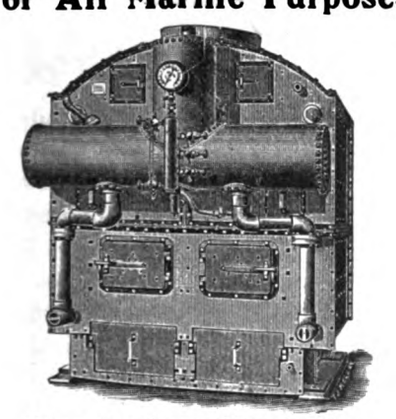
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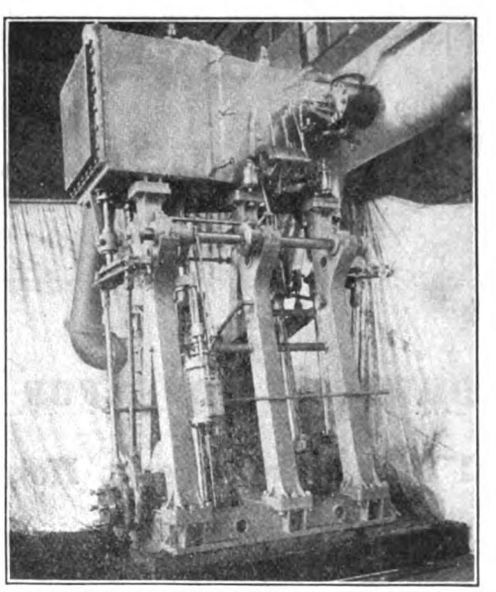
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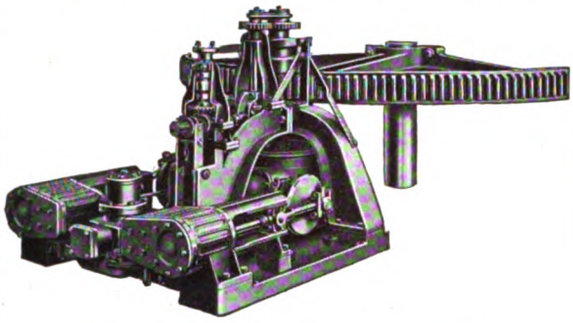
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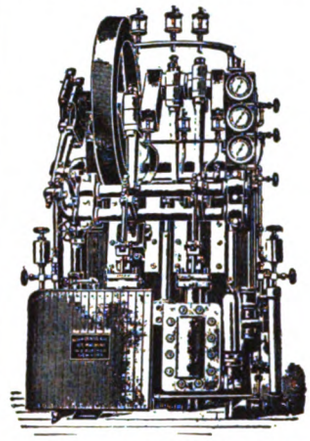
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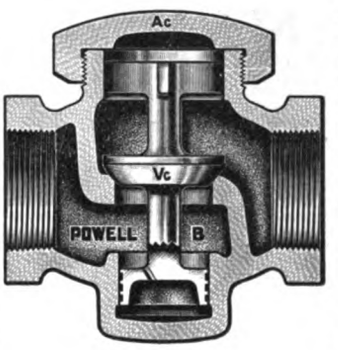
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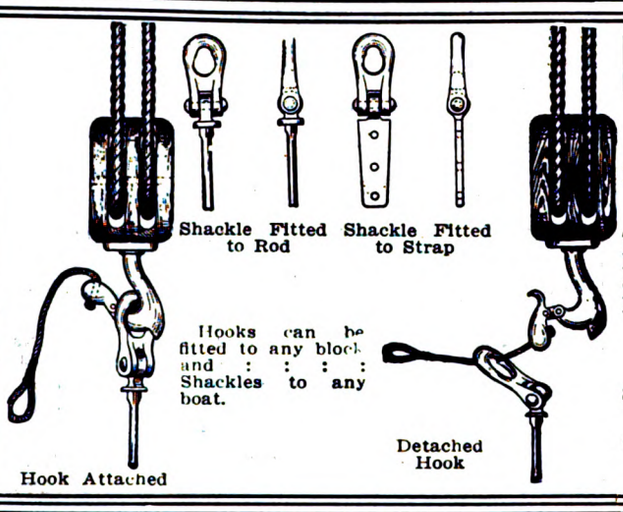
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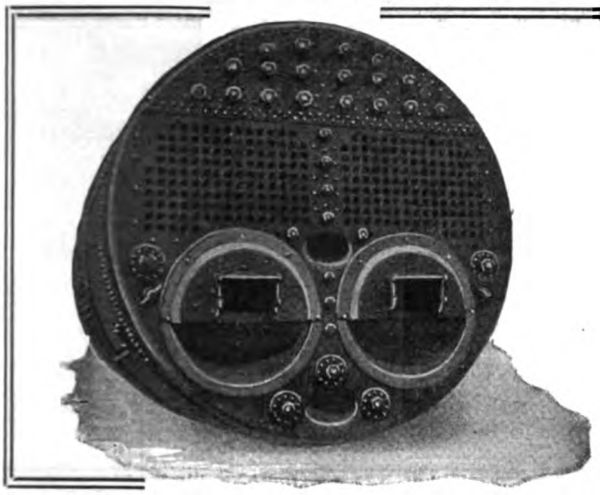
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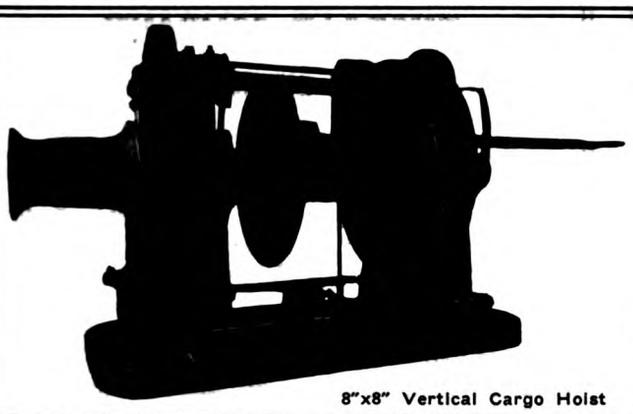


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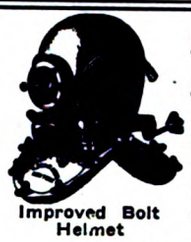
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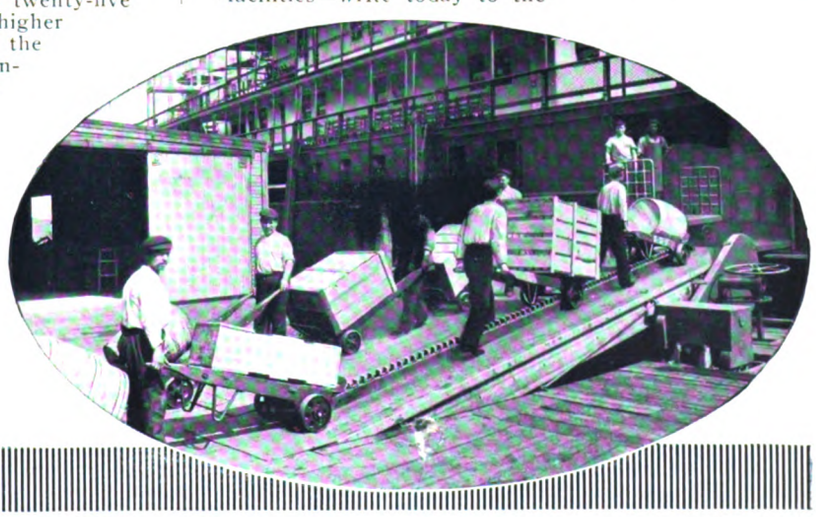
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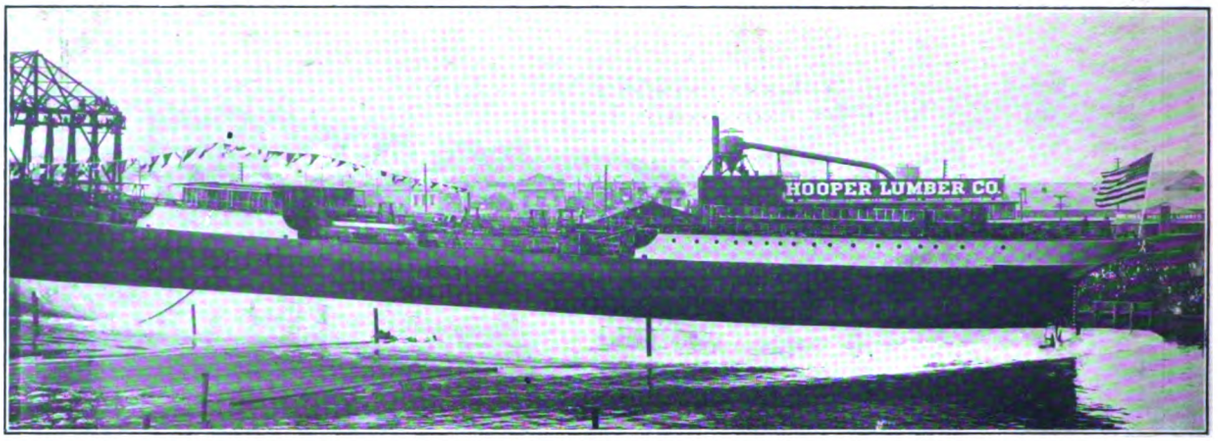
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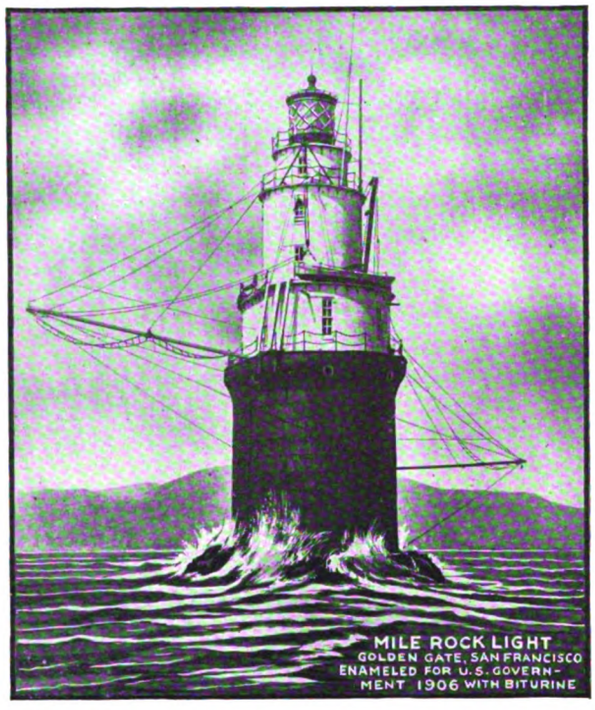
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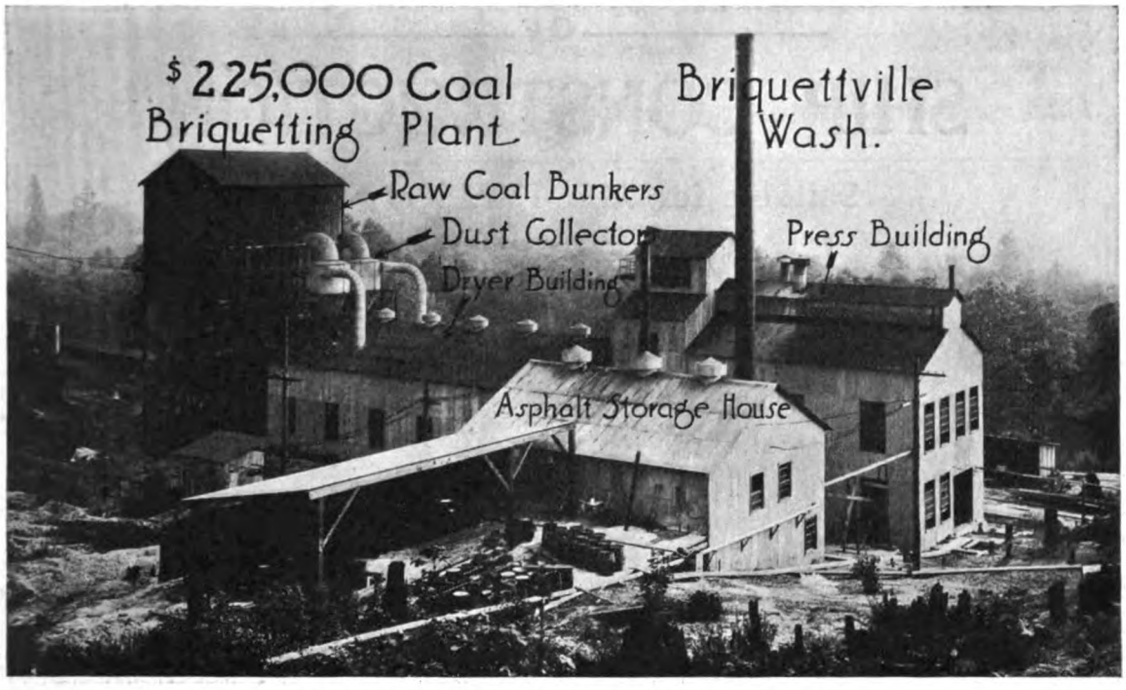
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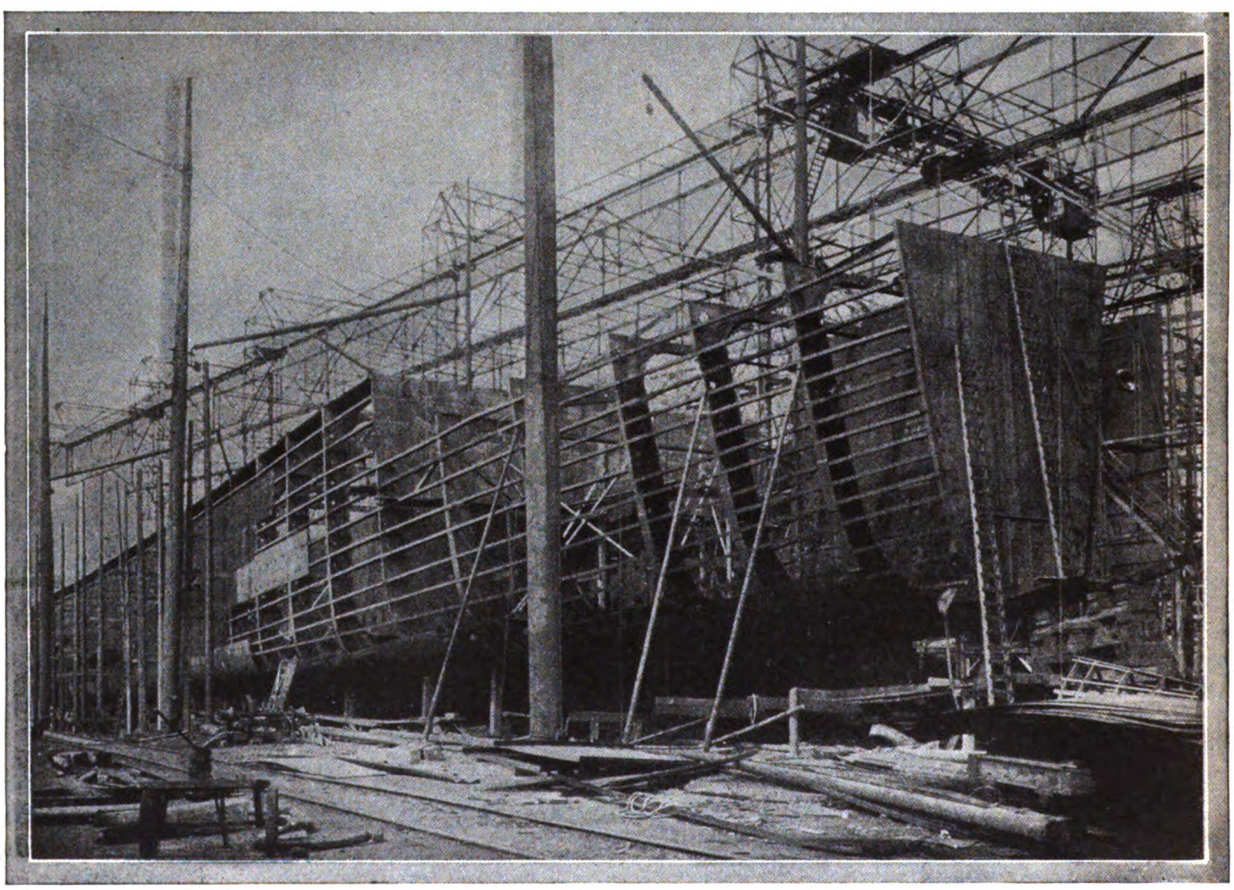
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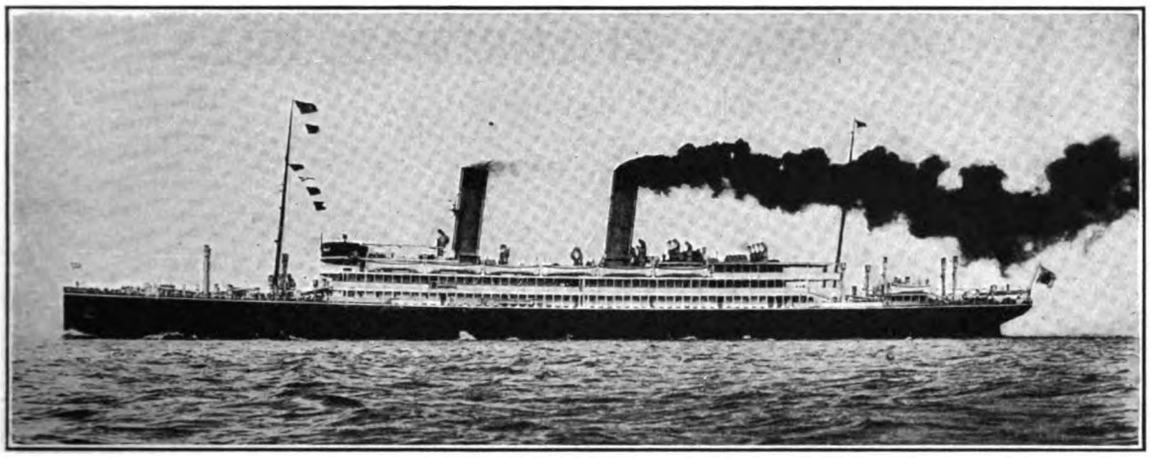
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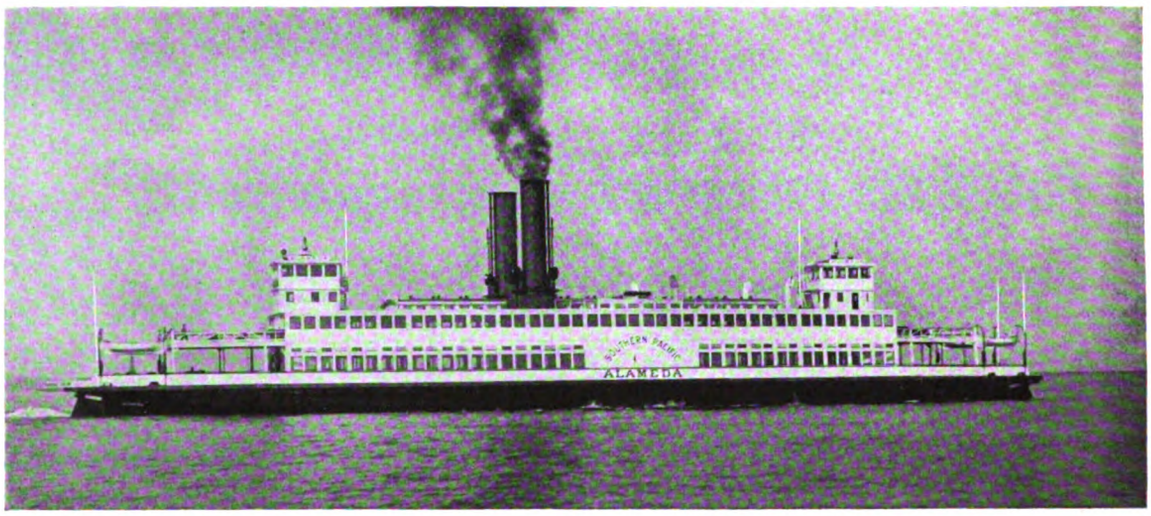
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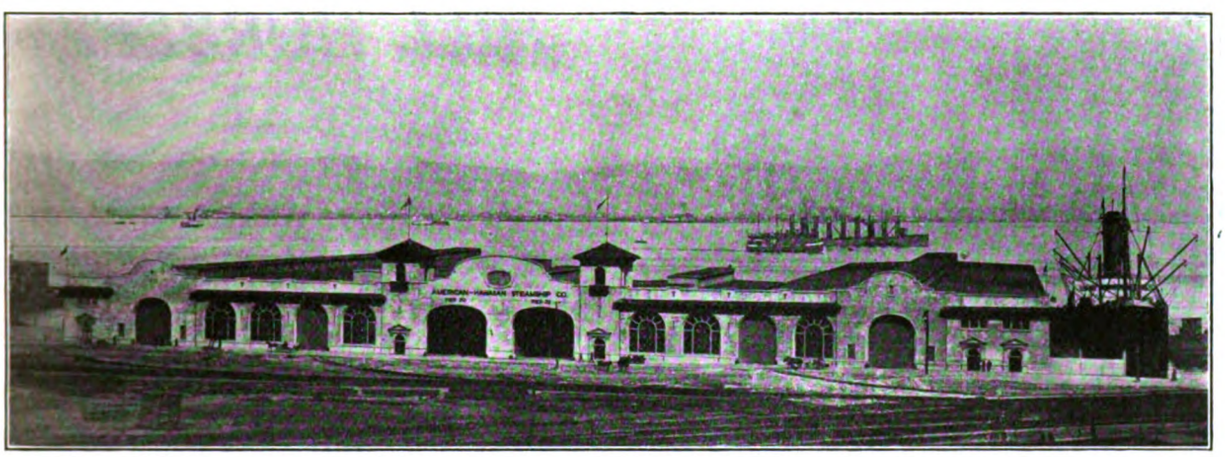
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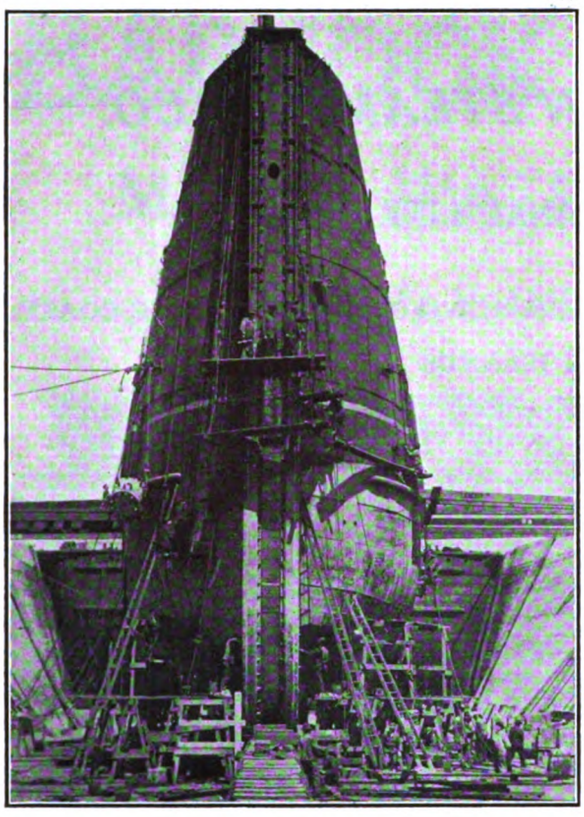
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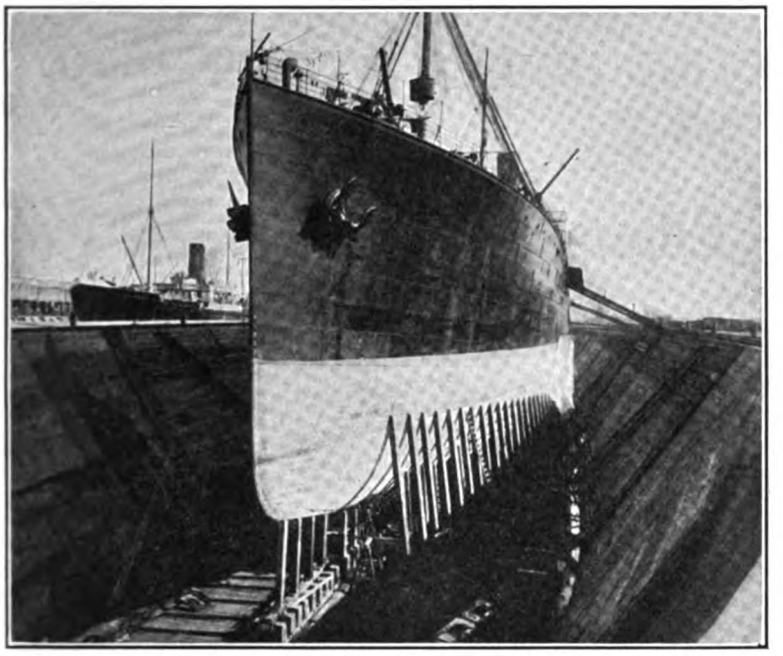
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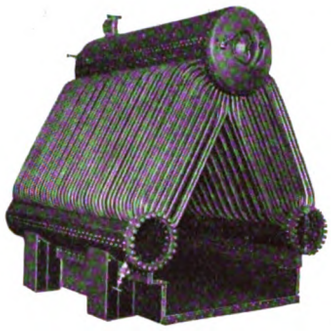
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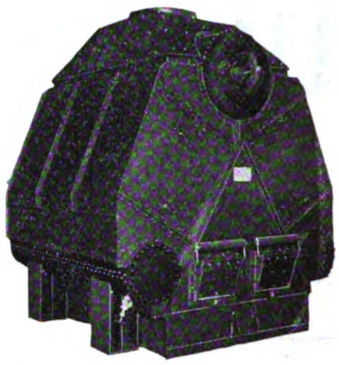
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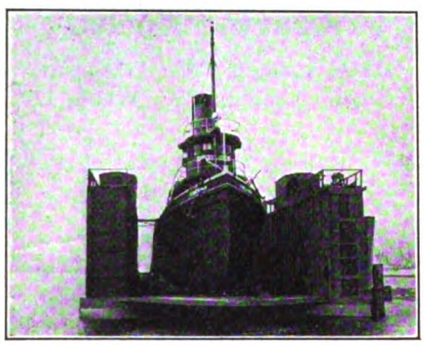
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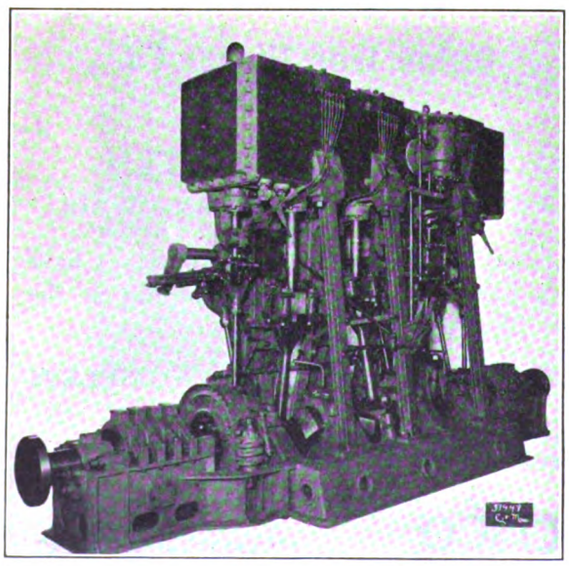


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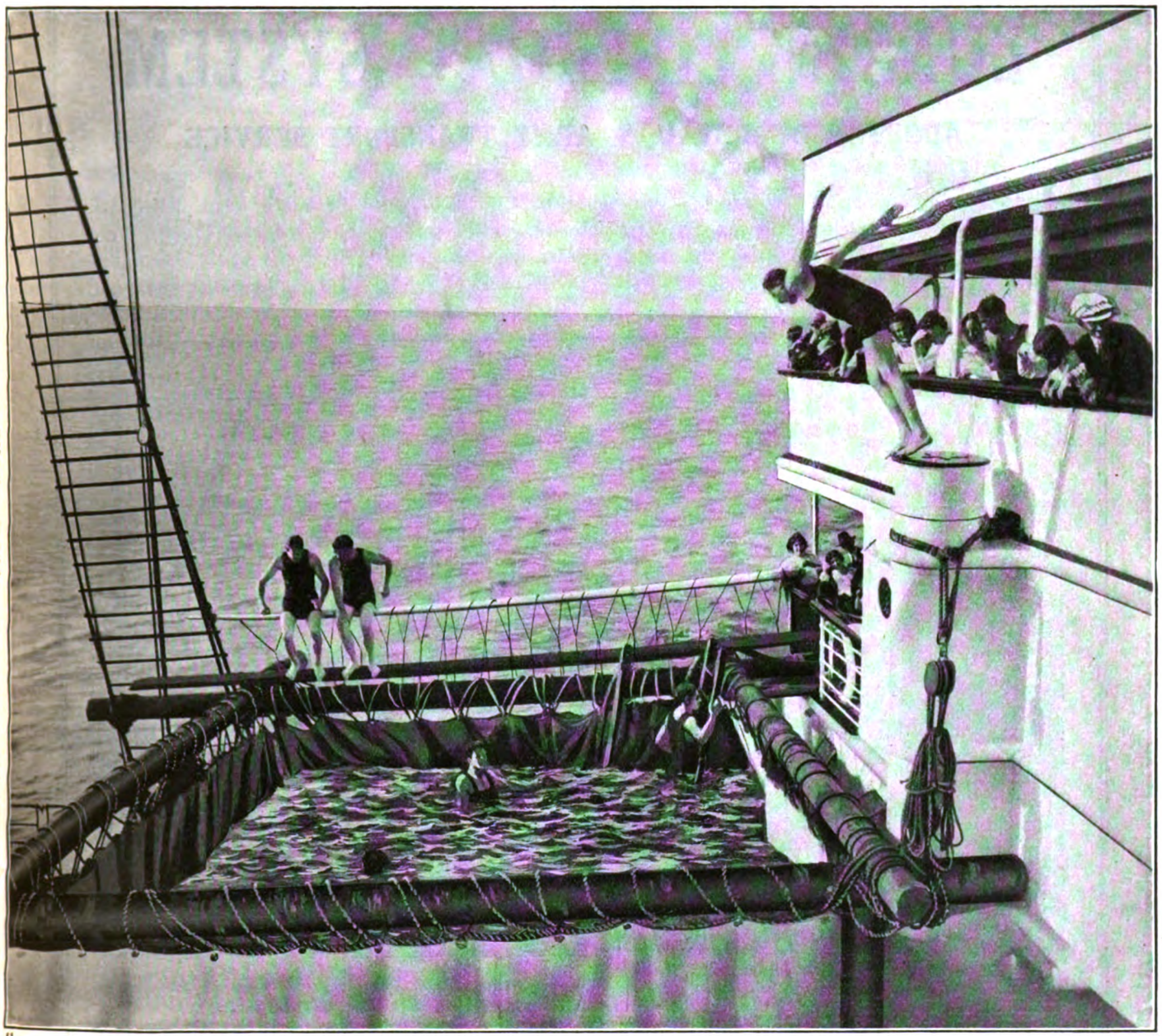
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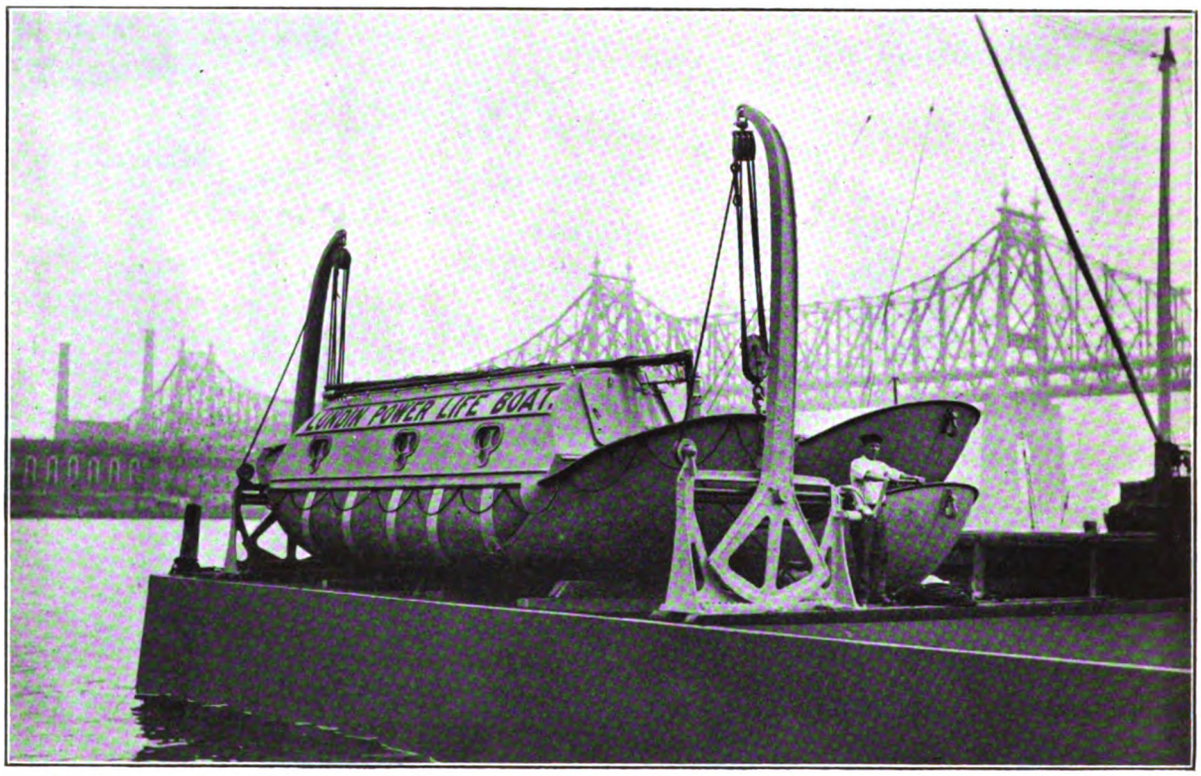
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PACIFIC MARINE REVIEW

OFFICIAL ORGAN OF THE SHIPOWNERS' ASSOCIATION OF THE PACIFIC COAST.

VOL. XII, No. 4. SAN FRANCISCO APRIL, 1915.

THE SEAMEN'S BILL

This Bill May Be Summed up Generally as Legislation to Discourage American Shipping, to Involve the Administration in Irritating Controversies with Friendly Powers and to Ensnare the Votes of Organized Labor

By R. P. SCHWERIN.

AFTER a two years' struggle between the labor leaders interested in trades both ashore and afloat and the shipowners, ship managers and agents, the Seamen's Bill became a law on March 4, 1915.

During the hearings before the House Committee on the Merchant Marine and Fisheries many men interested in American steamers in the coastwise trade appeared before that committee for the purpose of stating their views as to how the different requirements of this proposed legislation would affect their actual operations. It is doubtful whether any set of men were ever subjected to a more browbeating cross-examination than these gentlemen, whose only desire was to frankly and freely tell the members of Congress forming this committee exactly what their troubles might be *should* the bill become a law. There have been *some* sensational charges in regard to lobbying in Washington, but few lobbies ever had the force and power and the unlimited freedom of speech and conduct as the labor lobby looking after the interests of this bill. It was apparent to the gentlemen who appeared before this committee in behalf of the steamship interests that their connection with this American enterprise on the high sea was highly condemnatory and that their past history was filled with riotous glee over the brutal treatment of their employes, the loss of life at sea, the destruction of the property which they controlled and operated and, above all, it was shown to the satisfaction of some of the cross-examining lawyers, members of the committee, that they knew absolutely nothing about their business. In fact, one gentleman, member of Congress, on cross-examination, developed to his own satisfaction that the more freight and passengers a steamer carried the greater would be the steamer's loss, and, therefore, by partially filling the ship with a cargo of life-boats, cutting down the number of passengers, thus limiting the passengers and cargo, the ship would be a money earner; whereas, under previous normal conditions, she evidently was a money loser. It was apparent that it was this kind of information that the committee sought and acted on and, as a result, approved this law as written by the President of the International Seamen's Union.

In the Senate, Senator La Follette, who introduced the bill, to quote from the Providence (R. I.) *Journal* of March 8, "boasted of the fact that he was a landlubber; that he had nothing to do with the framing of the bill; he was ignorant of the subject-matter and had no intelligent notion of its possible effects and consequences, except that he was sure (and in this he was undoubtedly right) that it was satisfactory to the lobby which represented the Seamen's Union." That neither the House nor the Senate, after two years' struggle with this bill, really knew what it was doing, is evidenced by the fact that within a week after the bill became a law it was necessary for the Department of Commerce to submit the bill to the Department of Justice to interpret some of the

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many conflicting conditions of the bill. Is this surprising, if you consider that Mr. La Follette himself admitted he knew nothing about the conditions of the bill, and again, the people in the lower House who had charge of the bill so little considered its interlocking conditions that the Attorney-General must be called in to give a legal decision as to when different sections of the bill should become effective? If after two years of almost unremitting work upon this bill such is the result, what is the public getting for the salaries paid to legislators in Washington, with a labor lobby drunk with power putting into legislation anything and everything which they think might be of advantage to the creation of monopoly in labor, regardless of the man who must provide the Saturday night pay roll?

The one good thing about the bill is its title—

> "An Act to Promote the Welfare of the American Seaman in the Merchant Marine of the United States; to Abolish Arrest and Imprisonment as a Penalty for Desertion and to Secure the Abrogation of Treaty Provisions in Relation Thereto; and to Promote Safety at Sea."

Any uninformed person reading the title, which carries with it all the dignity of United States legislation, would naturally be impressed with the fact that here is something which is going to benefit, first, the American seaman, and, secondly, promote safety at sea. The legislation is now the law of the land and it remains to be seen whether anything but dire disaster will come out of these high sounding phrases, which, in words, represent so many better conditions.

What is an American seaman? Truly speaking he is an American-born or naturalized citizen who follows the sea as a trade. Technically speaking he is a man of any nationality shipped as a seaman upon an American vessel. There are so few American-born or naturalized seamen, this legislation must be in behalf of the foreigners serving upon foreign vessels. Outside the Great Lakes—and here also are a large number of foreigners engaged as seamen—the so-called American sailor represents every nationality in the world. It would be fair to suppose that a United States transport would have a representative American crew, yet one of these transports left San Francisco but a short time ago and a synopsis of the actual shipping articles shows that the crew consisted of the following people:

Place of Birth.	Number.
Philippine Islands	75
United States of America, (exclusive of licensed officers)	44
England	6
Ireland	6
British West Indies	3
Scotland	2
Germany	13
Austria	4
Denmark	3
Russia	2
Sweden	2
Spain	2
Finland	1
Hungary	1
France	1
Greece	1
Peru	1
Panama	1

This statement shows that 44 2/3 per cent. of this crew were Filipinos and that 26 1/5 per cent. were American by birth. This ship carried twenty-five sailors on deck, of which number nine were born in America; nineteen firemen, of which one was born in America; eighteen coal passers, of which one was born in America; of the three watertenders, two were born in America, and all five of the oilers were born in America; the remainder of the Americans in the ship's company were petty officers, yeomen, scullerymen and bell boys. Which shows that the United States Government is compelled to use largely other than American labor to maintain its ships at sea—the experience of all other shipowners. Americans will not shovel coal nor clean fires, but they will take clerical positions or positions as petty officers. It is apparent that the United States Government is forced to use Filipinos in manning the fireroom and commissary forces of its transports. During the debate in Congress great stress was laid on the fact that this bill would so ameliorate the condition of the seamen that it would be a great inducement for American boys to go to sea. From an examination of the crew of this Government transport it is apparent that the American boy has a chance on these transports but he must be of Filipino birth to get it.

The bill abolishes flogging. Does anyone reading this article remember of a reported flogging at sea? No man for the last thirty years would have dared to flog at sea, yet this bill comes out with great pomp and abolishes flogging, as if flogging were an every-day occurrence and through its present abolishment there is greater emancipation of the seamen from this past tyrannical and barbarous treatment of a century ago. The allowance of butter is slightly increased; and yet I doubt if there is an American ship that has ever attempted to feed its men merely upon the Government allowance and assert that if a shipowner should attempt to curtail the allowance of butter to what is now provided by this law, he would soon have the men at the mast demanding an in-

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creased allowance. The part of the bill in regard to the abolishment of flogging, the increase of butter allowance and providing washrooms and shower baths is just pure "bunk." What the President of the International Seamen's Union and his assistants were after—and what they got—was the absolute control of seamen of all nationalities that enter the ports of the United States and they did not care a whoop whether the bill bettered, or whether it did not better the men, provided it put them absolutely under their control, to regulate their employment at such wages and under such conditions as they would dictate.

As there is no American merchant marine in the foreign trade and as the union absolutely controls the coastwise trade to-day, the bill would have been of no use to them unless it could be so worded that the control was made to include the crew of every ship that should come to an American port; hence the clause providing for the right of a sailor to desert his ship, when and where he pleases, and the abolishment as seamen of those races who have long and faithfully fulfilled such duties aboard foreign ships in the foreign trade, such as Arabs, Hindus and Chinese, because it would be manifestly impossible for the Seamen's Union to take these men in as members of their union and control their movements while in a port of the United States. So to further establish the cinch, the requirement that "seventy-five per cent. of the crew, in each department thereof . . . must understand any order given by the officers of such vessel," was forced into the bill and these sections of the bill are the only parts in which the lobby was vitally interested because these provisions, becoming the law, make the leaders real leaders and the men their dependent slaves.

What has the United States Congress committed this nation to? It has instructed the President of the United States to serve notice upon all the maritime powers with whom we have commercial treaties that such treaties must be abrogated. They must be abrogated for this reason: *that* from the earliest time maritime law has provided that seamen were the wards of their nation and had to be cared for by that nation no matter in what part of the world they might become ill or indigent and at all times were they under the protection of their consuls. Marine hospitals were established and appropriations made to care for sick and injured sailors and to return them to their home ports. In return the seaman signed articles, under such rules and regulations as were prescribed by his Government, to stay with his ship until the voyage was completed and he was as morally and legally bound to stand by his contract as the owner and captain were morally and legally bound to stand by their contract with the seamen, under the laws of his nation, which provided for the employment and protection of the seaman and for the protection of the property which he had shipped to safeguard and care for. By this bill the United States says, "so far as the ports of this country are concerned, this shall cease and these contracts shall be of no force or effect and the moment a foreign ship enters a United States port, any seaman or the entire crew may go ashore, without the right of arrest and without the obligation to further fulfill their contract to return with the ship to its home port or to fulfill the voyage for which they shipped." The argument put forward by the labor lobby on this point was to the effect that the American mercantile marine had been handicapped in its development by two conditions: first, the increased cost of building a ship in the United States; and, second, the increased cost of wage to the crew. The bill provides that the foreign seamen shall have the same wages as the American-born, by the simple device of having the men break their contract and come ashore, with or without the solicitation of the Seamen's Union's business agent, then they would reship, perhaps on the same or another ship, at the going wages out of that port, and by that means the foreign shipowner would be compelled to pay higher, or American wages on his ships. In other words, the Sailors' Union, without a shadow of doubt, will use this condition of the law to persuade or compel foreign crews in American ports to leave their ships, remain under the jurisdiction of the union and reship at the wage established and put in force by the union. The foreign shipowner, regardless of the crew's contract with him, must let his ship remain idle unless he takes the crew put on board by the union and at the wages which they specify, nor will he be allowed to obtain any seamen except through the Seamen's Union. And to still further cinch this condition under the guise of safety at sea, forty per cent. of the crew of every ship, foreign or American, of over one hundred tons, excepting yachts and fishing boats, which leaves an American port, must be able seamen and these men must prove they are able seamen by passing an examination before United States Government inspectors. If they pass the examination they may obtain a United States certificate and they are not able seamen in the eyes of the law unless they hold such a certificate. The United States Government proposes to examine every foreign sailor who comes to the shores of the United States and grant a certificate as to his ability as a seaman and if there are not enough of these men who can pass such examination, then foreign ships cannot proceed on their return voyages, or continue their voyages, unless a sufficient number can

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be educated to fill the necessary forty per cent. requirement.

The certificates mentioned above apply only to able seamen but, in addition to the examination of the seamen, men in all other departments of the ship must be examined as to their qualifications for a certificate as life-boatman, as the law requires that a life-boat must carry one, two or three life-boatmen holding certificates showing that they are qualified for such position. Imagine the corps of examiners, speaking all the languages on the face of the earth, which must be employed to carry on the examination of several hundred thousand men and imagine how rare will be able seamen holding a certificate or life-boatmen holding a certificate when the Seamen's Union has trouble with some shipowner and does not propose that his ship shall go to sea, for without the ship having the required percentage of certified able seamen or the required percentage of certified life-boatmen, the ship is helpless to proceed to sea.

Can any employer of labor, either ashore or afloat, believe that any legislation in behalf of labor could so cinch the situation that labor could absolutely dictate every possible condition, and without any liability, and does any employer of labor or, in fact, any laborer himself, deny for one moment that the leaders in this movement are not going to take every advantage which this law permits?

Foreign nations have their own standards of safety and pay and accommodations for sailors, and apparently there is no agitation upon the ships of foreign nations as regards these conditions. In other words, the public is not aware that any dissatisfaction has been shown regarding these standards, neither has there been any complaint of the safety of British and German vessels and now our Government undertakes a novel procedure, i. e., a nation without a mercantile marine in the foreign trade making and enforcing standards for nations which have long served this country, on equal terms with themselves, and with general satisfaction. And while this Government is laying so much stress upon safety of life at sea, it apparently loses sight of the fact that the greatest safeguard at sea, outside of and beyond all importance of mechanical devices, is the efficiency of the officers to maintain discipline and ready and quick obedience on the part of the crew and order and cool behavior on the part of the passengers. It is impossible for the officers of a ship to have efficiency and discipline unless the crew remain by the ship voyage after voyage and are drilled in the many and diversified requirements of the ship. With a crew continually changing and with every ship practically constructed on different lines, it would be manifestly impossible to have this discipline if crews are to be continually shifting at the will of the union. The men may hold their certificates and be efficient, but they cannot be efficient in the specific details of any particular ship unless they have been drilled on that particular ship and in the duties that they have to perform under emergencies. A crew green on a ship which meets disaster almost immediately after leaving port will not be able to save life, even though they may have their "union card," the sailor's certificate of "A. B.," and the life saver's certificate of "L. S." This is so apparent that it is not necessary to enlarge upon the fearful cost this and some other nations will pay as a result of this most extraordinary legislation.

But we have legislated in this bill to provide that we will undertake to arrest the masters of foreign vessels, citizens or subjects of other powers, and punish them in our courts for acts which are entirely lawful in their own country. Does it seem possible that other nations will patiently submit to having their citizens, such as the masters and officers of its vessels, arrested in a foreign port and tried and fined and, perhaps, imprisoned for acts which are entirely lawful in their own country and under their own flag? We perhaps have a right to say that, "If you come to our shores you shall do as we tell you or you shall not come at all," and perhaps our farsighted legislators who have been promoting the United States shipping bill considered, when they practically said this in the Seamen's Bill, that it would bring about a condition in which foreign ships would not come to American ports and then they could say to the people of the United States that we were without either our own merchant marine or the service of a foreign merchant marine and, therefore, it were absolutely necessary that the United States Government should establish and operate its own merchant marine. A prophet might see these things and, while the writer does not profess to be a prophet, it might seem that the only excuse for enacting this bill into law would be to bring about such a condition with the ships of foreign nations as would compel the people of the United States to own and maintain their own merchant marine, and so Congress would be forced to pass the bill which apparently was found distasteful in the last session of Congress.

Another strong argument of the labor lobby was that this bill would provide an opportunity for American boys to go to sea and yet one of the most important members of the lobby at one of the hearings stated, with great complacency, that the result of this bill, in permitting men to leave their ships in American ports, would fill the American ports with the finest seamen in the world. The thoughtful man can not help but wonder, if our ports are filled with the ablest seamen of the other nations of the world, what chance has the American boy to get a job.

The United States Government has said clearly and distinctly under this Act that no vessel shall be per-

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mitted to depart from any port of the United States unless she has on board such and such men and the Sailors' Union, by this Act, will further say that no vessel shall be permitted to depart from any port of the United States unless she has on board such men as are supplied and at the wages demanded by the union. It therefore may be interesting to consider what Senator Root said in the Senate on this question on February 26, 1915:

"The bill, I think goes further, however, in the attempt to control foreign vessels than it is either expedient or lawful for us to go. I should like to call attention to some provisions which seem to me to be open to the second objection—that is, provisions which I think we have not any right to enact. In Section 4 there is found this provision:

"'Sec. 4530. Every seaman on a vessel of the United States shall be entitled to receive on demand from the master of the vessel to which he belongs one-half part of the wages which he shall have then earned at every port where such vessel, after the voyage has been commenced, shall load or deliver cargo before the voyage is ended and all stipulations in the contract to the contrary shall be void; *provided*, such a demand shall not be made before the expiration of, nor oftener than once in five days. Any failure on the part of the master to comply with this demand shall release the seaman from his contract and he shall be entitled to full payment of wages earned.'

"When the voyage is ended the seaman is entitled to the remainder of his wages. The section ends with this provision:

"'*And provided further*, That this section shall apply to seamen on foreign vessels while in harbors of the United States, and the courts of the United States shall be open to such seamen for its enforcement.'

"That provision plainly applies to contracts which have been made in the case of a foreign vessel in the home of the vessel. I may be mistaken, but I can see no other reasonable construction. A French, German, or Italian ship coming into the port of Philadelphia immediately becomes subject to this provision; its crew are navigating the ship under contracts made in France or in Germany or in Italy. Those contracts may have provided for any one of many different kinds and period of payments. It may be entirely in violation of the contracts that the seaman, one party to the contract, shall be entitled to demand and be paid one-half his wages up to the time when he reaches the port of Philadelphia. This provision, if I understand it correctly, declares that the seaman shall be entitled to have that payment notwithstanding the contrary contract. It declares that a contract to the contrary shall be deemed to be void, and it declares that the seamen shall have the assistance of the courts of the United States to enforce—what? Not the contract, but the obligation of law, the obligation arising upon the statute which voids the contract and substitutes a different obligation.

"Is it competent for us to do that? Of course every lawyer will concede that we have not power by our statutes to control or affect a contract made in a foreign country between two persons in that country; and as we cannot control or affect that contract, we cannot add to or detract from the obligation created by the contract as between the contracting parties. When we say that our courts will enforce a claim by one of the contracting parties against the other in violation of the contract, we say that our courts will by force of their process assist one party to violate the contract as against the other.

"Sir, that is a pretty harsh proposal. We have with most of the civilized maritime countries of the world treaties providing for freedom of commerce, treaties under which their ships are declared entitled to enter our ports to bring in merchandise and to take out merchandise, to be subject to tolls and port charges, directly limited and regulated; and, as respects all those ships, what does the proposal amount to but that we impose a new and different condition upon the exercise of the right secured by these treaties? We say, 'True, we have agreed with you that you shall have freedom of commerce; that your ships may enter our ports with their merchandise upon terms that are stated; but we will now no longer permit your ships to enter our ports; we will no longer permit to you freedom of commerce, except upon certain new conditions, which we impose of our own free will; that is to say, we will no longer permit your ships to engage in commerce with us except upon condition that you at home, in your own country, will make contracts with your sailors not in accordance with your public policy, but in accordance with ours.'"

The United States has some very serious problems confronting it. The business situation at home and the war abroad should cause prudence to take the helm now perhaps more than at any other time in our history. Let us hope that this legislation will not make the situation more difficult and serious than it now is in our relation with foreign governments and let us also be sure that if this legislation proves to be disastrous to American interests, we shall have the strength and fortitude to demand its early repeal.

The following is a clipping from the San Francisco Examiner of March 23, 1915:

"SEAMEN'S ACT PROVES PUZZLE TO OFFICIALS.

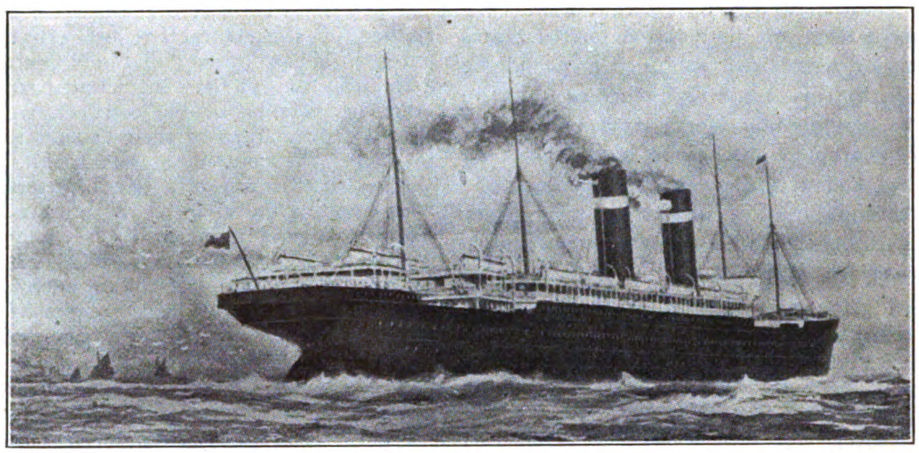
"Washington, March 22.—Shipping men and officials of the Bureau of Navigation, unable to determine when the Seamen's act goes into effect, have submitted three apparently conflicting sections in the law to the Attorney-General for an opinion.

"Section 6 of the bill says the restrictions imposed as to quarters for the crew shall apply to all merchant vessels of more than 100 tons register, construction of which shall have been begun after the passage of the act, which would mean after March 4 last, when the President affixed his signature.

"Section 14 provides that the new lifeboat regulations shall become effective July 1, 1915, while Section 18 provides that the act shall take effect as to all American vessels eight months after its passage, or on November 4, 1915, and in the case of foreign shipping twelve months after passage, or March 4, 1916."

This bill passed the Senate without roll-call and passed the House without roll-call. Why were the Senators and Congressmen afraid to vote on so important a bill?

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The S. S. "Finland," soon to visit San Francisco.

The Panama-Pacific Line

THE placing of the former trans-Atlantic steamers "Kroonland" and "Finland" on the New York-San Francisco run is an event that will be followed with particular interest by shipping circles on both coasts. These vessels are well adapted to the freight and passenger trade through the Canal and should receive hearty support fro mthe traveling public as their route offers a very attractive sixteen day sea voyage which is pleasantly broken in half by the highly interesting passage through the Canal. The "Kroonland" and "Finland" are twin screw steamers of 22,000 tons displacement, being 580 feet in length by 60 feet beam.

The "Kroonland" and the "Finland" possess numerous handsome public rooms and the lounges, smoking rooms and libraries are all very fine apartments. Several views given herewith illustrate the style of wood work and the lavish furnishing of these public gathering places. The cabins are peculiarly flexible in character and the staterooms are all airy and roomy, a feature which is very important on the Canal run. A large number of rooms are arranged to be used en suite if desired with private baths and toilets. Electric fans are provided in all the cabins in addition to the through system of forced ventilation.

These two liners will carry about 6000 tons of freight each and the freight and operating end of the business will be handled by the very well known firm of Swayne and Hoyt at San Francisco.



Library and lounging room of the "Kroonland."

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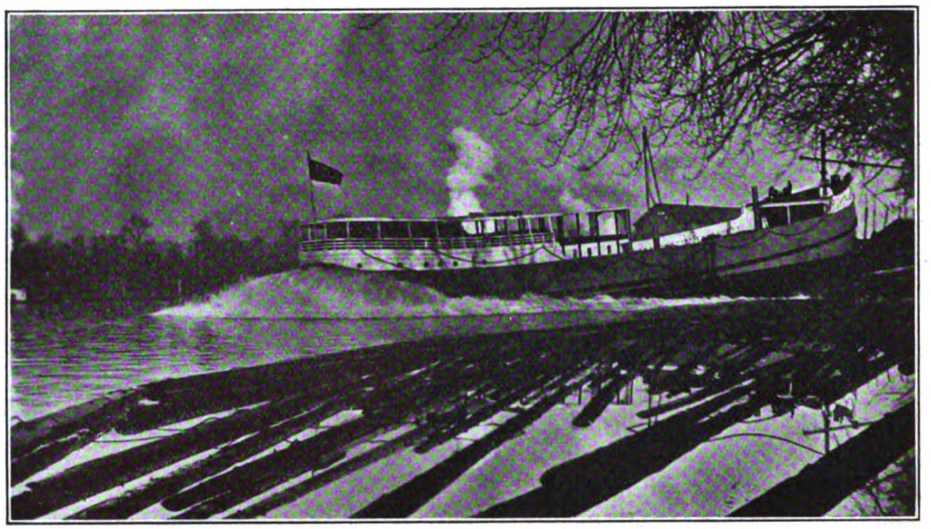
The "Kroonland" in Culebra Cut.

General offices have been opened in San Diego and Los Angeles under the direct charge of G. N. Koeppel, general agent. The passenger business at the San Francisco end will be looked out for by T. H. Larke, General Passenger Agent for the Pacific Coast with offices at 319 Geary street. Arrangements have been completed with the transcontinental railroads for the issuance of round trip tickets with the privilege of going one way by rail and the other by water. This arrangement contemplates the limited first class fare for the railroad portion of the trip is available for three months after issuance and holds stopover privileges. The "Kroonland" and the "Finland" have accommodations for 500 first class and 400 third class passengers.



A corner in the "Kroonland's" smoking room.

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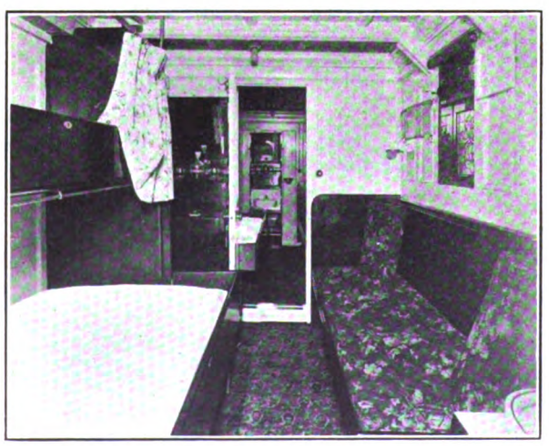


Launch of the "Wapama" at St. Helens.

THE LATEST LUMBER CARRIER.

The latest lumber carrier to arrive at San Francisco was the steam schooner "Wapama." The hull of this vessel was constructed by the St. Helens Shipbuilding Company of St. Helens, Oregan, and was towed to San Francisco where her engines have just been installed by the Main Street Iron Works. The principal dimensions of the "Wapama" are: length over all 216′ 8″, length between perpendiculars 207′ 8″, beam 40′ 6″, molded depth 17′ 6″, depth of hold 15′ 6″. Her lumber carrying capacity is 1,000,000 board feet and she has accommodations for sixty passengers. The "Wapama" is similar in power, speed and general design to the steamers "Multnomah," "Merced" and "Celilo," but is 2′ 6″ longer than these vessels. She was built to the order of Chas. R. McCormick & Company of San Francisco and will be operated in the coastwise lumber trade.

The machinery of the new boat was supplied by the Main Street Iron Works of San Francisco. The main engine is of the inverted cylinder triple expansion type with cylinders 13½″, 23″ and 40″ and a stroke of 30″. Steam is supplied by two Babcock and Wilcox oil-fired boilers, the indicated horse-power of the main engines being 825. Tucker's metallic packing is used exclusively throughout the engines.



A state-room on the "Kroonland," see page 19.

Mr. William Welsh, U. S. Shipping Commissioner for the Puget Sound District since October, 1913, died on March 8th. Mr. Welch was widely known throughout the Northwest, having resided in Tacoma since 1883. He was Commissioner of Public Works in Tacoma from 1904 to 1906.

Captain Harvey Copp, a master of many years' experience on the West Coast, has been appointed Pilot Commissioner for Vancouver to fill the vacancy caused by the death of R. H. Alexander.

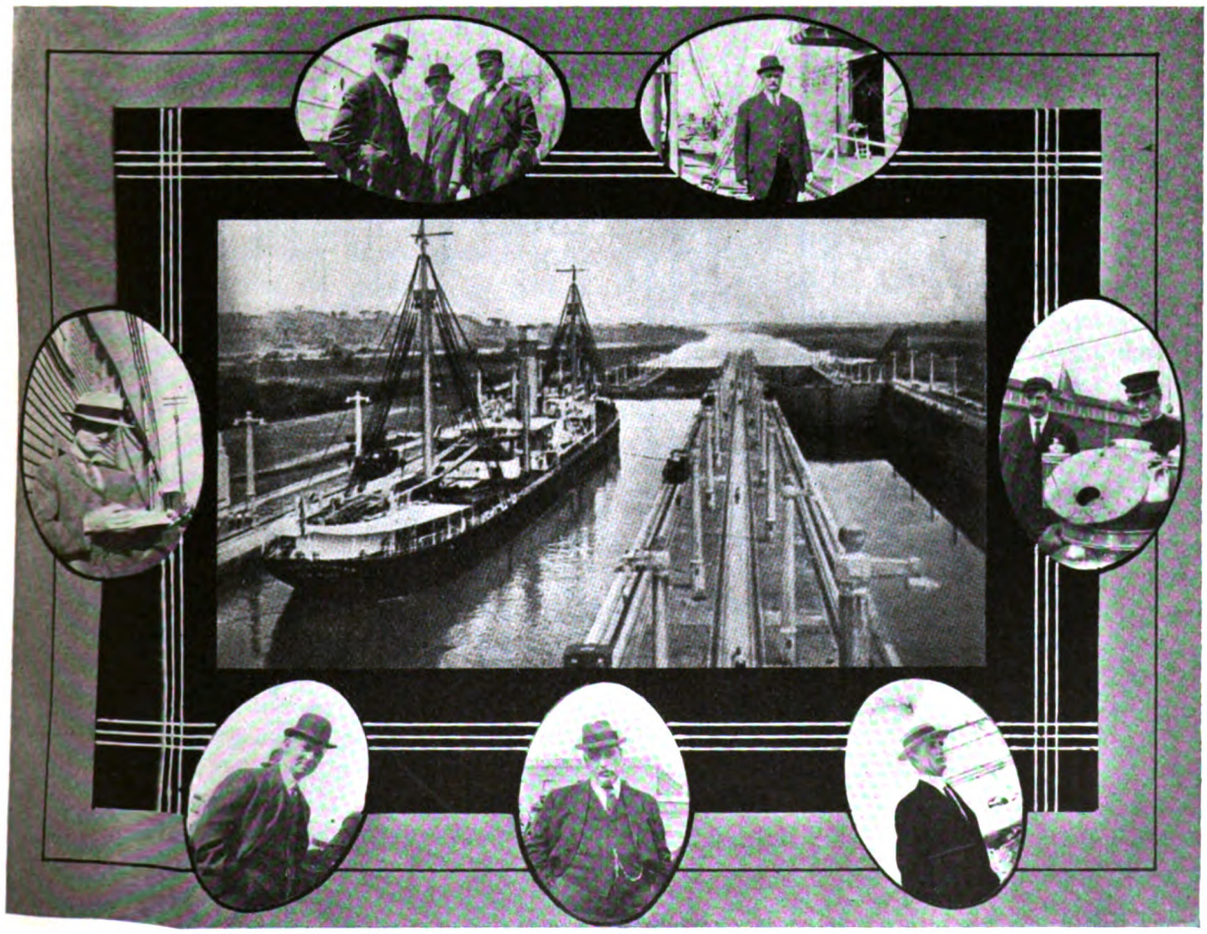
Mr. M. E. Farr, president of the Detroit Shipbuilding Company and vice-president of the Executive Board of the American Shipbuilding Company, one of the best known shipbuilders on the Great Lakes, was in San Francisco during the latter part of the month. In addition to taking in the Exposition, Mr. Farr is making a careful survey of the shipbuilding conditions on the Pacific Coast.

The Government has awarded a contract to the Seattle Construction & Dry Dock Company for the building of three submarines for coast defense. The new submarines will be capable of a speed of 14 knots on the surface and 11 knots submerged, the main power plant consisting of two 450 H. P. Nlseco-Diesel engines in each boat.

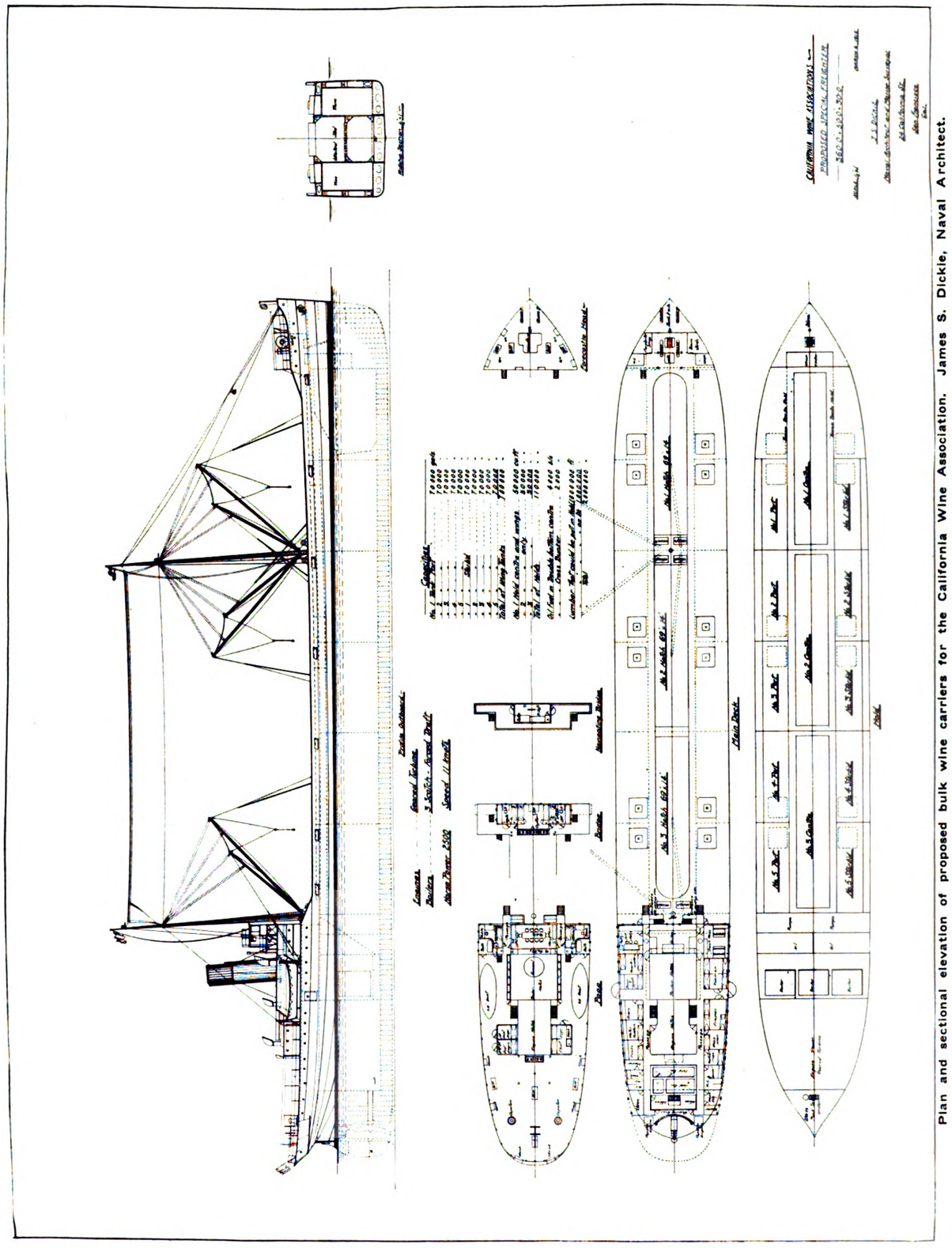
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The upper picture shows the American-Hawaiian steamer "Texan" at her dock, and the lower a freighter of the same line in one of the Panama Canal locks, while grouped about this picture are some of the line's captains. Upper left—Captain Duffy, W. Moore and Captain Anderson; upper right—Captain Charles Nichols; center left—Captain Blackwell; center right—Captains Duffy and Ryer; bottom left—Captain Knight; bottom center—Captain Hall; bottom right—Captain Hellman.



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Plan and sectional elevation of proposed bulk wine carriers for the California Wine Association. James S. Dickie, Naval Architect.

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A New Venture in Transportation

FOR years the problem of transporting California wines in bulk has occupied the attention of the great wine producers of the State. From time to time attempts have been made to get the steamship companies to build tanks in their vessels so that competition could be had with the present methods of carrying wine in tank cars to the great distributing centers in the East. Steamship companies are very conservative and have not been able to see the advantages that could be derived from this specialized form of transportation, especially as the tank spaces would be of little use in the carriage of general goods as return freight, and without a return freight the cost of carriage would hardly allow of competition.

The wine production of the State is vastly greater than its consumption and the problem of transportation to distributing centers thousands of miles away is a serious one. Only by means of ships with a great capacity for wine and a considerable remaining space for other cargo can the transportation be cheaply effected. A ship constructed to carry wine alone would be of little use in carrying a return cargo. Such a ship could be constructed and could carry wine at a fair rate in the same manner that oil is now carried in tankers which almost invariably return to their port of lading in ballast. Should the wine industry of the State be allowed to take its natural progress, the wine ship would naturally follow, but the present legislative unrest compels attention to the possibility the future holds of curtailment or destruction of the progress of half a century.

Having weighed carefully all the conditions affecting their industry and their product, the California Wine Association is making ready to take the bold step of entering into a new field of transportation. The illustration shows the tentative design or outline of the vessel with which they intend to inaugurate their new departure.

Briefly it is their intention to carry eastbound some 700,000 gallons of various California wines and nearly 3000 tons weight of lumber, wine in barrels (special shipments), general freight, etc. Enough oil fuel will be carried to take the ship from San Francisco to New York and back to Balboa, where oil will be taken on to take the ship back to San Francisco. The return freights, already practically arranged for, will be of a heavy nature not requiring the use of the wine tanks for stowage.

Their own wine movement will now require the services of three such vessels, the secured return freights will more than load them and the only freight of which there is any doubt is the cargo in excess of wine from California East, and there is little doubt that this can be secured at remunerative rates.

It is at present proposed to carry the wine in a number of side tanks as indicated on the plan; every precaution will be taken to prevent the wine changing in temperature or becoming contaminated by sea water or other foreign matter. With this end in view an inner skin is put between the wine tanks and the sides of the ship. It has also been considered advisable to put the stiffening for the tank walls outside the tanks themselves as far as possible so as to secure flat surfaces which can be easily cleansed.

The general freight will be carried in the central hold and lumber on deck and also in the central hold as occasion demands. It is considered that there will always be a plenty of lumber offering for deck load.

The general arrangement of accommodations for crew is as usually fitted in freight steamers. Some modifications will be made in the arrangements shown in accordance with the developments that have occurred since the plan was made, especially in the forecastle, which will have to have a closed end on account of the deck load.

The machinery will be a turbine with either electric or geared reduction. Diesel motors and twin screws are also under consideration, but it is likely that the turbine will be finally adopted. As originally laid off the plan called for reciprocating engines, but on account of fuel economy it was decided to adopt the most efficient method of propulsion available.

It will be noted that expansion trunks are fitted to each tank to take care of the expansion of the wine which is about .00035 of volume per degree Fahrenheit difference of temperature. Special provision will be made to keep the wine from contact with the atmosphere even in the expansion trunks. The tanks will be lined with a resistant medium to keep the wine from actual contact with the steel walls.

Each wine tank will be provided with a separate pumping system complete with individual suction line, discharge line, pump, etc. The pump for each tank will deliver about 10,000 gallons per hour. The wine will be delivered to the vessel through these same lines.

The scheme in general is to take on great quantities of the several wines which are the product of the California Wine Association's vast vineyards, loading them at their own wharf at Winehaven and discharging them into their own storage at New York for distribution throughout the Eastern States. Such other cargo going and return as will enable them to do this economically will be carried and their hope is to establish a self-sustaining line of ocean

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ships carrying California wines in bulk not only to the East but also wherever a demand for California products will induce a lucrative California trade.

The wine-carrying vessel is designed to make six round trips from San Francisco to New York each year and would therefor transport 4,200,000 gallons of wine during the twelve months. As the California Wine Association ships over 10,000,000 gallons of their product to New York per annum there is no doubt about the practicability of the proposition as at least two more of these bulk carriers could be profitably employed.

JAPANESE LINES ACTIVE.

The withdrawal of many British steamers from the Pacific trade routes has given the Japanese lines an opportunity of strengthening their fleets as the amount of freight offerings demand new tonnage. The Nippon Yusen Kaisha, which maintains a regular service between the Orient and British Columbian and Puget Sound ports, has placed an order for six new steamers with the Kawaski shipyard at Kobe and the Mitsu Bishi yard at Nagasaki. These vessels are in addition to six others previously ordered and now in various stages of construction. The new ships will be of about 7500 tons each. The Nippon Yusen Kaisha has inaugurated an unsubsidized service between Europe and the Orient via the Panama Canal, and the first vessel, the "Tukushima," has already completed her first voyage. An auxiliary service has also been started through the Suez Canal, a group of fine steamers which are to make London by the eastern route and return to Japan via New York and the Panama Canal, thus making a complete circuit of the world. The Osaka Shosen Kaisha has two seventeen-knot steamers, the "Hawaii Maru" and the "Manila Maru," ready to start on the North Pacific coast route by July. Taken all together the Japanese lines seem to be following a far-sighted policy and preparing steadily and persistently for the splendid future on the Pacific which they have every reason to believe is theirs.

A recent issue of the Munsen Dempo Shimbun, an interesting wireless paper, contained the following item on the income of motor drivers in Tokyo. The English is quaint and instructive:

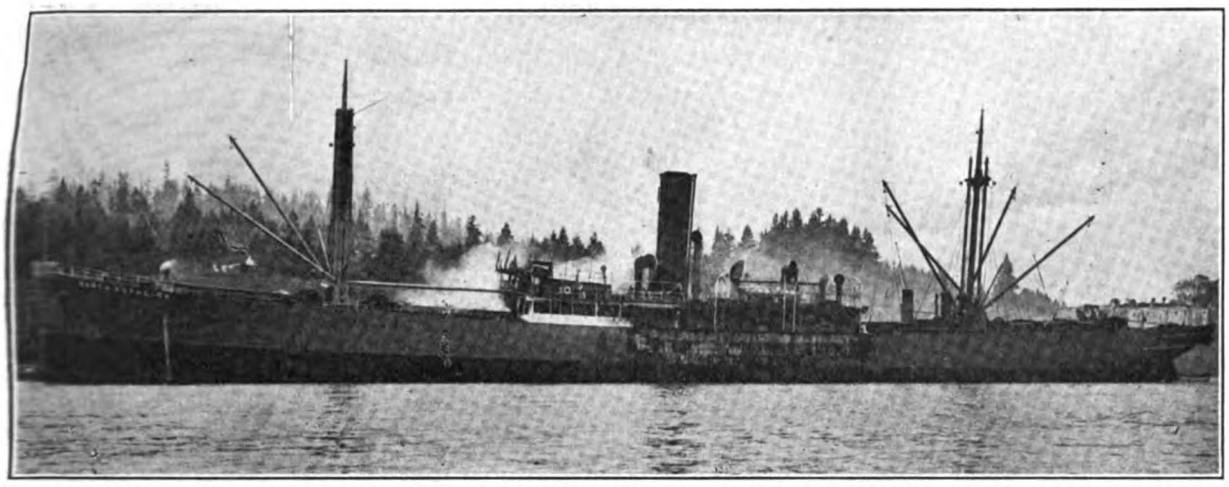
"The income of automobile drivers in Tokyo has recently diminished in some degree, owing to the prevailing bad times. However, seeing the difficulty of earning handsome incomes by other occupations, it permits them no grudge of their comparatively decreased income. It is usual that they get 25 yen as salary, but tips and gratuities they receive from fares will reach 85 yen per month on an average. If they enter the service of wealthy families, they are allowed the salaries from 30 yen and 50 yen, not counting tips and gratuities from masters or guests to the amount of some 30 yen. As the salary of 50 yen is generally thought difficult to receive even by ordinary young men with regular education in Japan to-day, their occupation seems enviable one. As it is, it is quite the reverse to the supposition of outsiders, apart from monetary matters. They are apt to tell that their sense of the part of the body lower than the waist becomes utterly benumbed when they handle the cars running at high speed in the teeth of keen wind in winter time. Furthermore, they are always harassed by the anxiety of not running over people or not colliding with Kuruma, wagons and other things. How they tax the work of their brains by these anxieties can better be imagined than described. Especially, when they are running their cars along thoroughfares crowded with many people, they always feel agonising uneasiness.

"It is natural that they are so much concerned about running their cars, for, when people happen to be run over by motor-cars, the drivers are usually severely punished."

Portland's Large Repair Job

ON March the sixth the Willamette Iron and Steel Works, of Portland, completed the reconstruction of the steamer "Santa Catalina" of the Atlantic and Pacific Steamship Company's fleet, which was severely damaged by fire in the Columbia River on October 18th last. The "Santa Catalina" was proceeding up the Columbia when an explosion occurred in her boiler room. The fire which resulted completely gutted the vessel amidships for a distance of approximately 150 feet. The photographs shown herewith give an excellent idea of the extent of the damage. Frames, deck beams and skin and deck plating were warped and twisted, the house amidships was completely destroyed, the finish being burned out entirely and the engines, boilers, steam and exhaust piping, etc., while not fatally damaged, all required thorough overhauling. During the fire the vessel was beached and with the assistance of the Portland fire department the flames were extinguished after

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The "Santa Catalina" on fire on the Columbia River. This view was taken shortly before the flames were extinguished.

a fight of 36 hours. The steamer was then towed to her Portland dock, where her cargo was discharged.

On November 18th the Willamette Iron and Steel Works started the work of reconstruction, undertaking to deliver the vessel in sixteen weeks. That they were able to complete the extensive repairs within the time specified speaks very highly for their efficient organization and their facilities for handling this class of work.

The "Santa Catalina" is a sister ship of the "Santa Cecelia," and is a shelter deck type cargo steamer of 10,000 tons deadweight capacity. She is 420′ 0″ in length, 54′ 0″ beam and 36′ 9½″ molded depth. She is fore and aft schooner rigged with two masts, and four derricks to each hatch served by double winches of the Williamson type mounted on derrick tables.

The machinery of the "Santa Catalina" consists of a quadruple expansion engine with cylinders 25½″, 37″, 52½″ and 76″ by 54″ stroke and steam is supplied by three single-ended, oil-fired, Scotch boilers 15′ 5¾″ in diameter by 12′ 4″ long built for a working pressure of 220 pounds. The oil fuel is carried in a thwartship deep tank and in the double bottom. There is a refrigerating equipment with a refrigerated hold of 500 tons capacity. The vessel was launched in July, 1913, and had made only two trips to the Pacific Coast at the time of her unfortunate accident.

In reconstructing the vessel it was found necessary to entirely remove the pilot house, bridge, boat deck and cabin. A large portion of the shelter deck plating and small portions of the main and 'tween deck plating were removed. Sixty-one plates were removed from the vessel's sides and twelve of the main web frames had to be replaced. The damage to the engines and boilers, while considerable, was slight in comparison to the upper works of the ship. The main engine, auxiliaries and engine and boiler room piping had to be completely overhauled, however, and minor repairs were necessary on the three boilers.

In rebuilding the upper works of the "Santa Catalina" it was found advisable to change the original plans of the cabin accommodations. The deck house was made thirteen feet shorter and the wireless room was removed from the forward to the after end of the boat deck. Four new cargo masts and four winches were installed, two of each to serve number two and number three holds. The new arrangement greatly facilitates the handling of cargo into and out of these two hatches.

The steel work, with the exception of the renewed web frames, was all fabricated by the Willamette Iron and Steel Works. The twelve heavy web frames were supplied by the William Cramp and Sons Ship and Engine Building Works, the original builders of the vessel.

The joiner work in the newly constructed cabins of the "Santa Catalina" is a job of which Portlanders can justly feel proud. This part of the large contract was under the direct supervision of the St. Helens Shipbuilding Company. In this connection the teak wood pilot house is an exceptionally fine piece of joiner work while the Oregon fir used in the captain's cabin has attracted a great deal of attention. The main saloon was finished in oak the same as the original cabin.

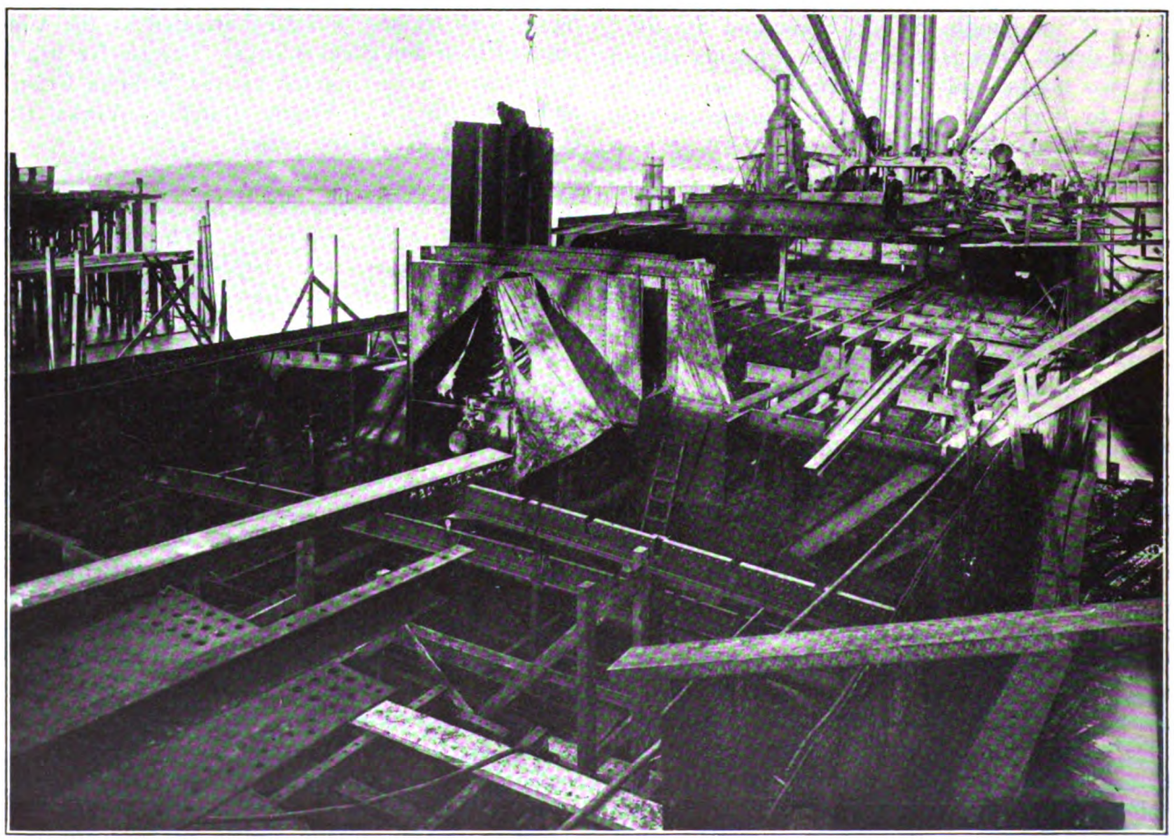
The vessel was turned over to her owners on March 6th, the ceremony being made the occasion of a gathering of the principal business men of Portland, who were brought together by the natural desire to celebrate the successful completion of the largest repair job ever undertaken at that port. The "Catalina" completed loading about 7000 tons of cargo on March 25th and entered her regular run between the Atlantic and Pacific.

The character and extent of the work on the "Santa Catalina" establishes Portland's right to be considered as a port where ship repairs of any character can be safely and expeditiously handled.

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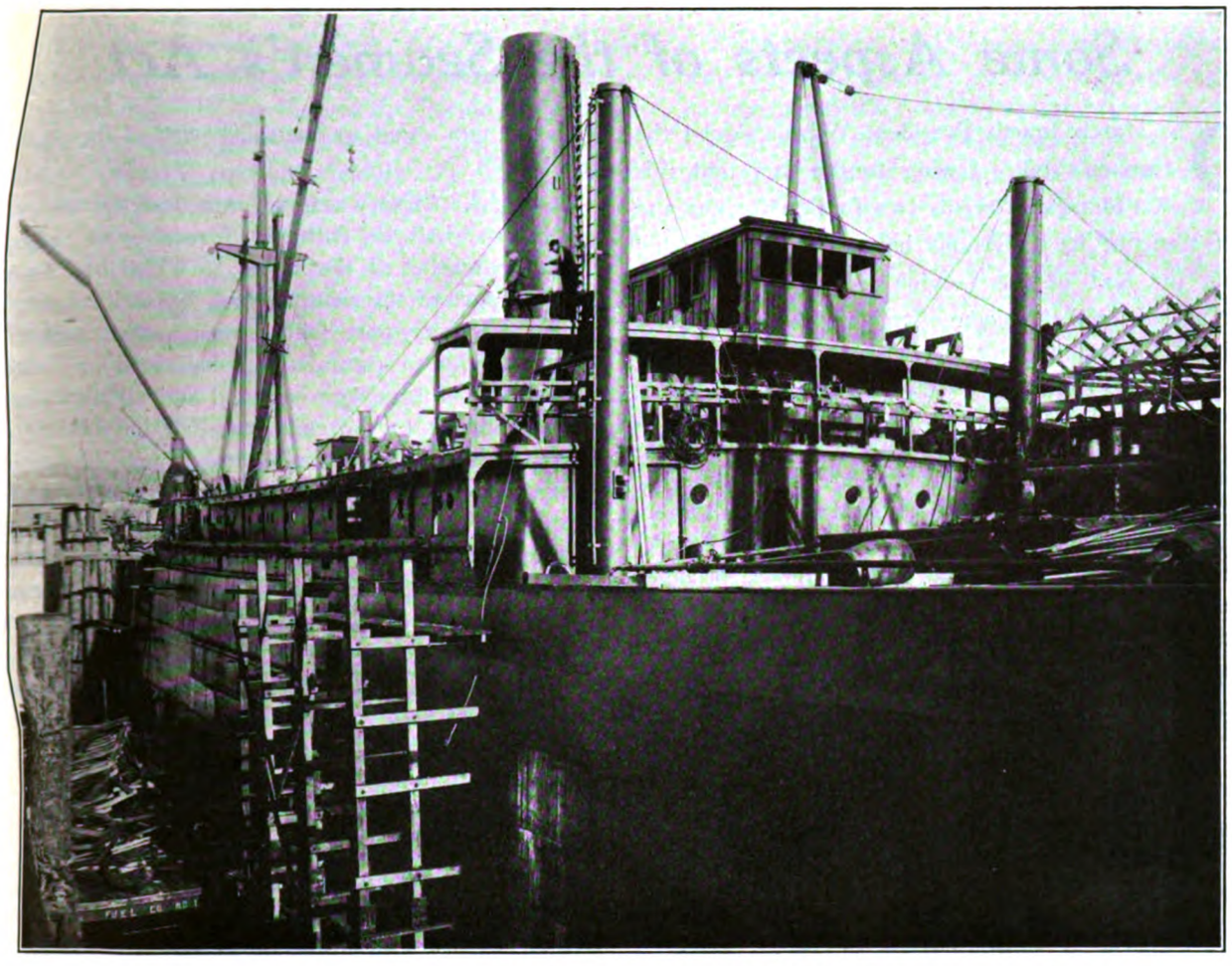


This picture illustrates the destructive effect of the fire on the weather deck amidships.



View showing a large section of deck plating removed and new longitudinals and deck beams in place.

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View of the renewed deck house and bridge showing two of the new cargo derricks in place.



The "Santa Catalina" with the extent of fire damage outlined on her hull.

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Some Aspects of the Seamen's Act

ON March fourth President Wilson signed the Seamen's bill. Owing to the fact that this Act abrogates twenty-two foreign treaties and that some of its provisions have been lifted bodily from the text of the London Conference different sections of the Act become effective at different times. Section 6, dealing with the space allotted the deck crew, the provision of a hospital room, etc., became effective when the Act was signed by the President as it only applies to vessels with American registry. Section 14, which deals with boating, drills, duties of different branches of a ship's crew in cases of emergency, etc., and which follows rather closely the recommendations of the London Conference, becomes effective on July first, thus coinciding with the time provisions of the Conference. All other sections of this Act go into effect on November 4, 1915, as far as American ships are concerned and on March 4, 1916, foreign ships touching at American ports must comply with the provisions of the Act. Generally speaking, the date fixed for the Act's application to foreign vessels is purely an arbitrary one as in reality the ships of different nations would be affected at different dates. The President is directed to notify each foreign power of the abrogation of the treaties which are nullified by the Seamen's Act, and such notification is to be made before June 4, 1915. These treaties all require that a certain period shall elapse between the notification of abrogation and the actual annulment of the treaty. In other words, some of the foreign powers will be affected before March 4, 1916, while others may have a month or two of grace after that date.

The first section of the Seamen's Act specifies the replacement, if possible, of any member of the deck crew who is missing through desertion or casualty by a new man who shall have the same or higher rating than the missing party.

Section 2 fixes nine hours, inclusive of the anchor watch, as a day's work and also forbids the working of the deck crew in the fireroom or vice versa except in emergencies.

Section 3. "The master or owner of any vessel making coasting voyages shall pay to every seaman his wages within two days after the termination of the agreement under which he was shipped, or at the time such seaman is discharged, whichever first happens; and in the case of vessels making foreign voyages, or from a port on the Atlantic to a port on the Pacific, or vice versa, within 24 hours after the cargo has been discharged, or within 4 days after the seaman has been discharged, whichever first happens; and in all cases the seaman shall be entitled to be paid at the time of his discharge on account of wages a sum equal to one-third part of the balance due him."

Section 4. "Every seaman on a vessel of the United States shall be entitled to receive on demand from the master of the vessel to which he belongs one-half part of the wages which he shall have then earned at every port where such vessel, after the voyage has been commenced, shall load or deliver cargo before the voyage is ended and all stipulations in the contract to the contrary shall be void: Provided, such a demand shall not be made before the expiration of, nor oftener than once in five days. Any failure on the part of the master to comply with this demand shall release the seaman from his contract and he shall be entitled to full payment of wages earned. . . . And provided, further, that this section shall apply to seamen on foreign vessels while in harbors of the United States, and the courts of the United States shall be open to such seamen for its enforcement."

Here we have the remarkable spectacle of an "Act to promote safety at sea" placing a premium on desertion. In Section 7 a punishment is provided for desertion as follows:

"Forfeiture of all or any part of the clothes or effects he leaves on board or of all or any part of the wages or emoluments which he has then earned."

This provision contains the one touch of comedy in the entire Act. It does not take much stretching of the imagination to picture the valuable "effects" which the sailor would leave behind, and surely, since desertion is nearly always a premeditated act, the sailor would have taken advantage of Section 4 and gotten away with one-half the wages due him.

This clause of the Seamen's Act in conjunction with the language provision of the bill is bound to give Japan a tremendous opportunity to still further strengthen her hold upon the commerce of the Pacific Ocean. A steamer with Japanese officers and crew fulfils all the requirements of the Seamen's Act and furthermore the crew, generally speaking, would not desert at an American port. Furthermore, a Japanese crew comes nearer to fulfilling the "Able Seaman" provision than a crew of any other nationality. Japan draws upon a great fishing population for men to work her merchant ships and if you scratch a fireman or a waiter you find a sailor.

American-owned ships cannot secure Japanese registry. Those engaged in the transpacific trade might make some dicker with the Chinese Government whereby they could take out Chinese registry and carry a Chinese crew, but it is also necessary, on account of the Language Clause, to have Chinese officers and it is very doubtful if these could be secured.

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The operation of American ships in direct competition with Japanese ships has been rendered an impossibility. In the case of the Pacific Mail Steamship Company, the only American line operating to the Orient on regular schedule, the direct expense in wages prohibits the use of a Caucasian crew. This line, then, is presented with several alternatives. The vessels might be disposed of by selling them for service in the coast to coast trade via the Canal. They might take out British registry and engage in trade between countries where they would not be interfered with or they might lay up in San Francisco Bay for years like the vessels of the Oceanic Steamship Company were formerly forced to do. In the latter case we would have a chance to point out with pride to the last visitors at the Panama-Pacific International Exposition how solicitous our lawmakers have been about building up a foreign trade merchant marine.

Section 6 is now in effect and provides that on all American vessels whose construction shall have been begun after March 4, 1915, every place appropriated to the crew of the vessel shall have a space of not less than 120 cubic feet for each sailor or apprentice and a floor area of not less than 16 square feet for each person. Also berths cannot be tiered more than two high. In addition to the above, there shall be on every vessel which makes a voyage of more than three days between ports, and carries a crew of twelve or more sailors, a hospital room.

Sections 7, 8 and 9. These sections deal with various penalties imposed on officers or seamen for such offenses as desertion, insubordination, etc. Section 9 does away with flogging, but since there was no flogging going on its appearance is evidently for the purpose of creating false impressions in regard to the life of a sailor.

Section 10 sets forth that each sailor shall receive five quarts of water per day instead of four and two ounces of butter per day instead of one. These provisions have no practical application to American ships as the men are fed greatly in excess of the requirements of the law at the present time.

Sections 11 and 12 are wholly devoted to the protection of the sailor's pay envelope from loan sharks, runners, boarding house keepers, etc. Allotment of wages are allowed only when made in favor of immediate family of the seaman and such allotment must be signed and written before and approved by the Shipping Commissioner. Also the right to garnishee or to serve attachment on a sailor's wages is abolished except in the case of court orders dealing with the support of a wife or minor children.

Section 13. This section contains the much discussed language clause and therefore, as far as transoceanic shipping and more particularly trans-Pacific shipping are concerned, is of paramount importance to the Pacific Coast. This section states:

"That no vessel of 100 tons gross and upward, except those navigating rivers exclusively and the smaller inland lakes and except as provided in section 1 of this act, shall be permitted to depart from any port of the United States unless she has on board a crew not less than 75% of which, in each department thereof, are able to understand any order given by the officers of such vessel, nor unless 40% the first year, 45% the second year, 50% in the third year, 55% in the fourth year after the passage of this Act, and thereafter 65% of her deck crew, exclusive of licensed officers and apprentices, are of a rating not less than able seamen."

Then follows the specifications for an able seaman to the effect that the applicant must be at least 19 years of age and shall have served 18 months on deck at sea or on the Great Lakes, bays, sounds, etc., or 12 months in the Navy, the boats of the Coast Guard Service or Government approved school ships. Upon the completion of such term of service the embryo seaman makes application to the local board of inspectors, receives a physical examination and is given an able seaman's certificate. There is a provision allowing the applicant to get a certificate after 12 months of service, but in such case he must pass an examination as to seamanship as well as a physical examination. That part of Section 13 dealing with the enforcement of its provisions is as follows:

"The collector of customs may, upon his own motion, and shall, upon the sworn information of any reputable citizen of the United States setting forth that this section is not being complied with, cause a muster of the crew of any vessel to be made to determine the fact; and no clearance shall be given to any vessel failing to comply with the provisions of this section: Provided, that the collector of customs shall not be required to cause such muster of the crew to be made unless said sworn information has been filed with him for at least six hours before the vessel departs, or is scheduled to depart."

The remainder of the section is given over to the penalties for making false affidavits and also the penalties meted out to officers of a vessel for breaking any of the provisions of the section.

It is the consensus of authoritative opinion in Washington that this section of the Act goes into effect on November 4, 1915, as far as American ships are concerned and is applicable to all foreign vessels on March 4, 1916.

It will be noted that the language of this section is positive. The "collector of customs" is given no discretionary powers but he "shall" cause a muster of the crew. A careful reading of the language clause in conjunction with the provision for its enforcement makes it very clear that its framers were determined to make it "loop-hole" proof. English

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speaking officers and Oriental crews can no longer exist on any vessel touching at an American port once Section 13 is in force. Even if 75% of a Chinese, Singalese or Hindoo crew were able to understand the comparatively few orders they ever receive when delivered in English, in other words if the letter, if not the spirit, of the Act could be complied with, the Oriental crew would still be an impossibility. If a vessel carrying one hundred Chinese in her crew and commanded by English or American officers was protested at the custom-house, and those for whom the Seamen's bill was framed would naturally see to it that such a vessel was hindered on every trip, the correctness or falseness of an affidavit concerning the linguistic abilities of a hundred Chinese would take many times six hours to decide and might well consume days. Such delays would inevitably ruin both the passenger and freight business of any steamship line.

In case the affidavit of some "reputable citizen" was sustained and a vessel with a Chinese crew was refused clearance papers, the result would be doubly expensive to the steamer's owners. The Chinese crew could not be discharged at an American port and would have to be carried back to a Chinese port, the ship being worked by a new crew taken on at the highest rate of wages. This latter crew would have to either bring the vessel back to the port whence they shipped or be transported home on some other steamer at the owner's expense. In short, the first successful protest under the language clause of the Seamen's bill would effectively do away with any possibility of operating any vessel to or from an American port with an Oriental crew.

Section 14 deals with boating, manning the boats and certificated lifeboat men. It is largely adopted from the London Conference on Safety of Life at Sea.

Sections 16, 17 and 18 make provision for the abrogating of foreign treaties and fixes the dates on which various phases of this legislation will become effective. Section 17 sets forth that as soon as the necessary time has elapsed after the President has notified other powers that their treaties are null and void in so far as they deal with matters embraced in this Act that "Section 5280 and so much of Section 4081 of the Revised Statutes as relates to the arrest or imprisonment of officers and seamen deserting or charged with desertion from merchant vessels of foreign nations in the United States and Territories and possessions thereof, and for the co-operation, aid and protection of competent legal authorities in effecting such arrest or imprisonment, shall be, and is hereby, repealed."

This section is sure to meet with a warm reception from every maritime nation in the world. It is doubtful if its provisions can be made to stick without raising serious trouble with foreign powers. If an English steamer with English officers and a Chinese crew arrives at San Francisco and is then refused clearance papers, what action would Great Britain take in the matter? This is the question that will be interesting shipping people until such a situation actually arises. We do not pretend to know the answer, but we feel sure that some retaliatory measure will sweep every American-owned vessel engaged in the foreign trade either off the ocean or into the protecting arms of British registry.

The seamen are jubilant over their victory, but just what this victory will cost remains to be seen. It was won by continual fighting along the lines of appeal to the heart rather than to the brain. That the "Terrible Slavery" of the poor, downtrodden sailor had become an obsession with many men at Washington, D. C., is evidenced by the following telegram from Senator La Follette to the Sailors' Union of the Pacific:

"As you meet to celebrate the thirtieth anniversary of your organization I rejoice that in the Providence of God I am permitted at last to hail you as free men under the Constitution of our country. The fourth of March, 1915, is your emancipation day. The Act approved by President Wilson makes America sacred soil and the Thirteenth Amendment finally becomes a covenant of refuge for the seamen of the world. In the years to come, as you commemorate this great event, you should dedicate a part of the service to the memory of Andrew Furuseth. Except for his intelligent, courageous and unswerving devotion to your cause for twenty-one years you would be bondsmen instead of free men to-day.

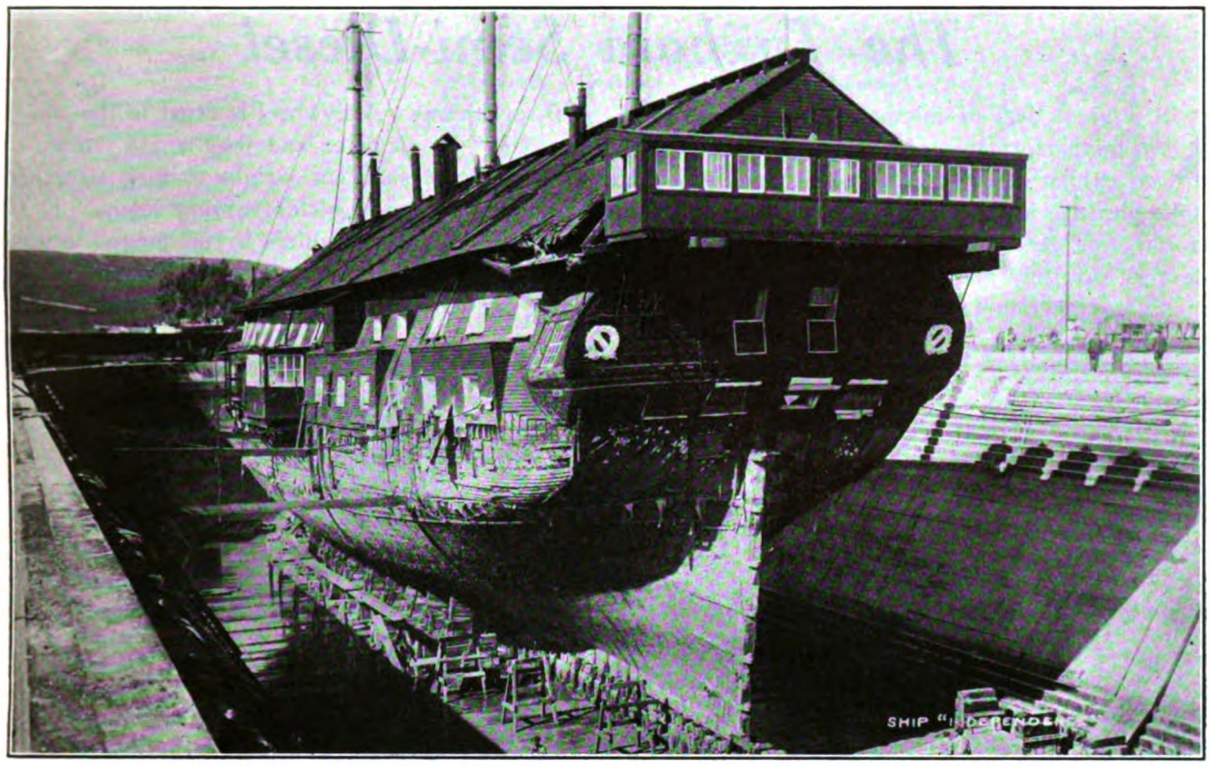
ROBERT M. LA FOLLETTE."

A new customs quay of solid masonry is now being constructed at the port of Guayaquil, Ecuador. This new wharf will prove of great benefit to shipping visiting this port.

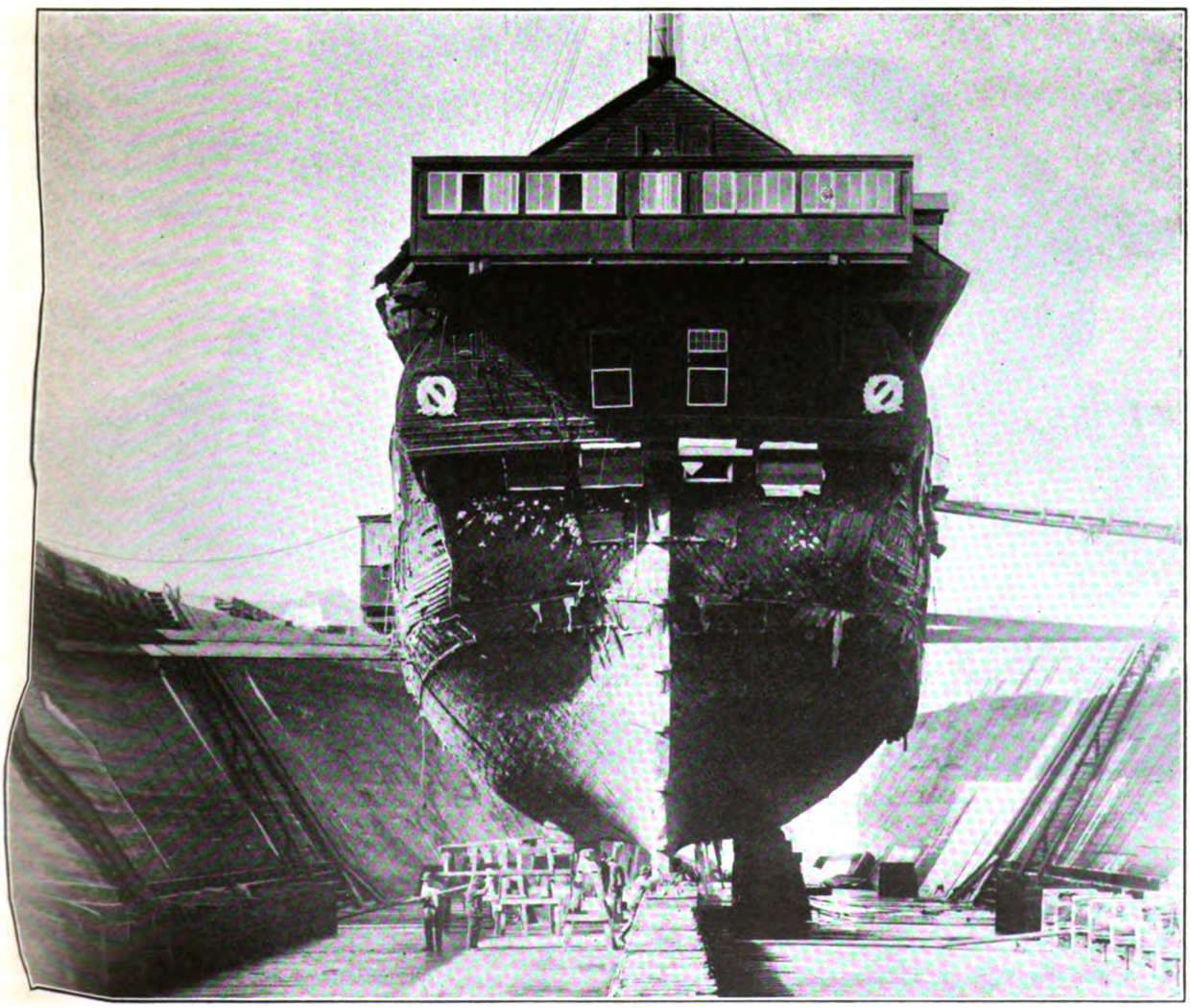
THE "INDEPENDENCE" DOCKED.

Recently the old frigate "Independence" was docked at the Hunters Point plant of the Union Iron Works and the accompanying illustrations give an inkling of the splendid condition in which the bottom of the fine old craft was found to be. This is the "Independence's" first visit to a dry dock in thirty-seven years, and dock officials were somewhat skeptical about the condition of the ship's bottom, but to their surprise they found the oak planking to be in splendid condition and there was not even a seam open wide enough to insert a toothpick. The "Independence" is about one hundred and five years old, but the splendid material and workmanship put into her hull has defied the passage of time.

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Port quarter of the "Independence" in Hunters Point drydock.

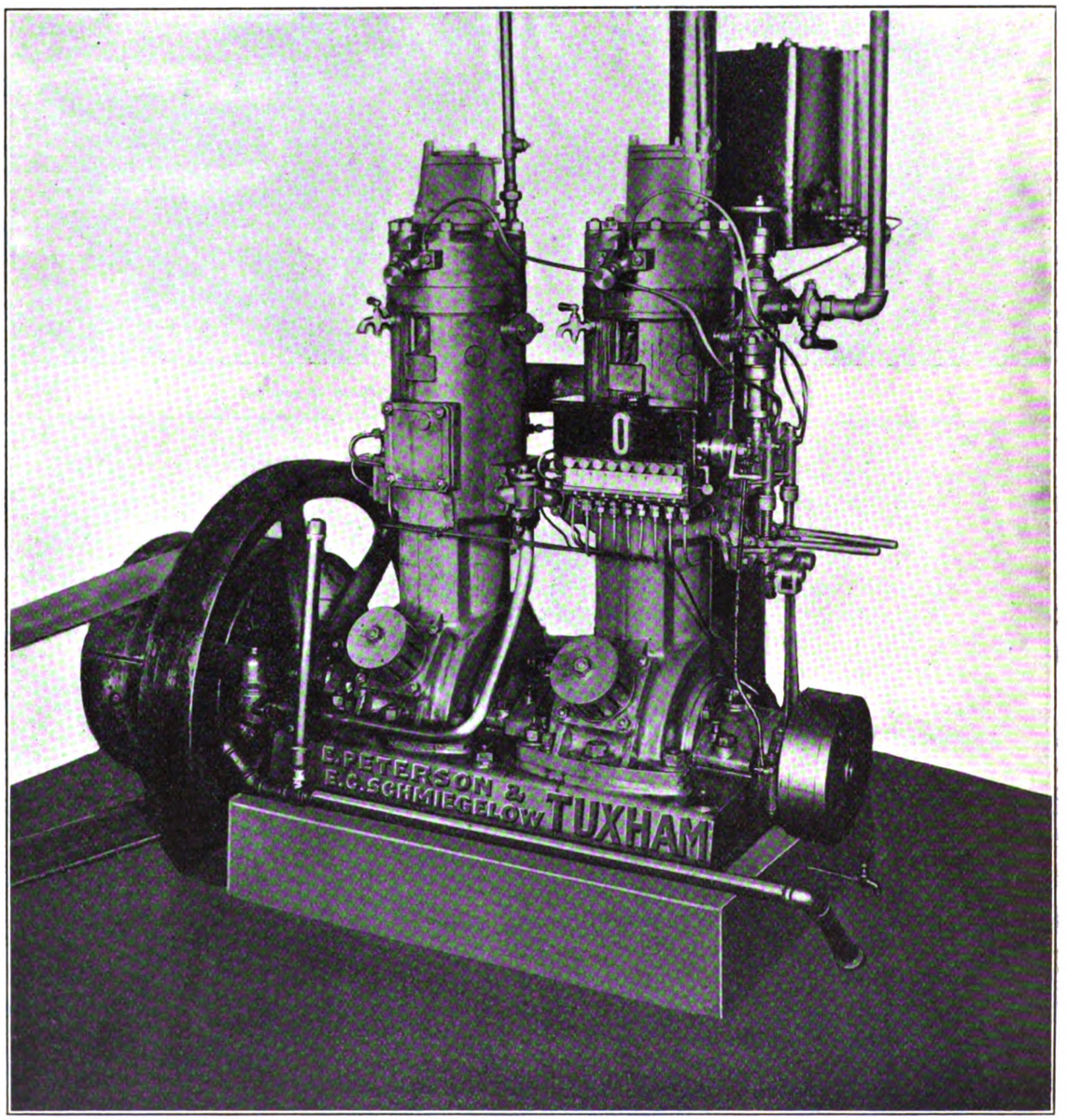


The stern of the "Independence." Note the excellent condition of the planking below the water line.

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The Tuxham Semi-Diesel

AS a great deal of interest is being manifested in the performance of the Tuxham engine now on exhibit at 209 Main street, San Francisco, we take pleasure in presenting to our readers the results of some recent fuel tests. These tests were made very carefully and as the engine was operated from six to ten hours on varying loads the results may be taken as fair average performances during regular running.

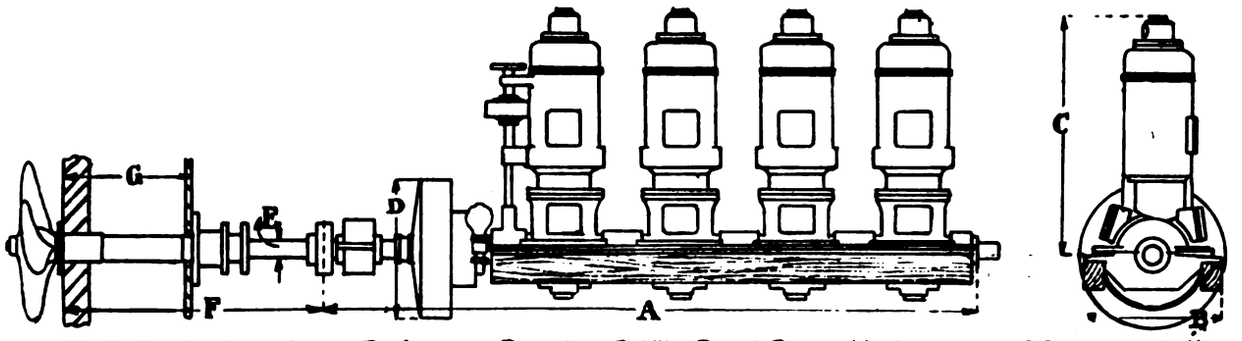


The two-cylinder, 28-horsepower Tuxham engine now being run for demonstration and testing purposes.

The Tuxham engine used in these tests is a 28 horse-power (rated) two-cylinder, two-cycle, vertical engine of the trunk piston type. The diameter of the cylinders is approximately 7½" and the stroke about twelve inches. The normal speed of this engine is 450 revolutions. A flywheel is fitted to the shaft, being 35½" in diameter and with a 5½" face. This flywheel is of sufficient weight to give a very close regulation of speed under varying loads. The fuel is supplied to the cylinders by oil pumps located on the side of the engine, the stroke of these pumps being regulated by a shaft governor, so that an injection of fuel is positively insured at every stroke and the amount of fuel supplied each cylinder is regulated accurately in accordance with the requirements of the load. The injection nozzle is of simple design and no regulation is required on it at any time.

The fuel used during the tests was the ordinary

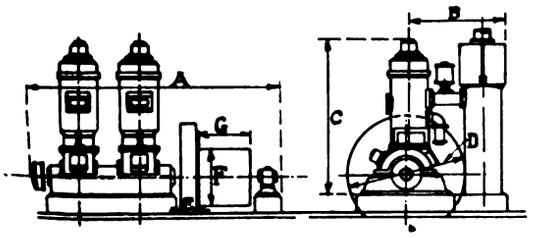
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4-Cylinder Tuxham Marine Engine with Propeller Outfit Direct Reversible by means of Compressed Air.

Diesel-engine oil now in common use for motor purposes and which is sold at a price but slightly higher than the crude oil used for firing under boilers. The oil was of 24 degrees Baume and had a specific gravity of .909, the flash point was 175 degrees F., firing point 200 degrees F., water 5%, sulphur under 1%, asphalt 25% and with a thermal value of 19,000 B. T. U. It was found that as soon as the engine warmed up that the exhaust vapors lost all appearances of smokiness and became a very light blue in color.

The power of the engine was measured by the use

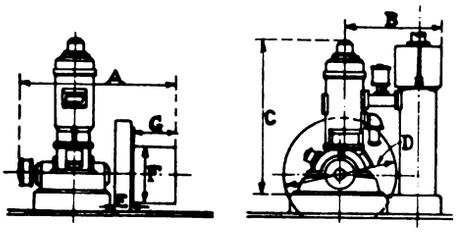


The standard two-cylinder type.

of a dynamo and a water-cooled rheostat. During the full power tests the output averaged 29 horse-power, or one horse-power over the rated capacity of the motor. The fuel consumed per hour on these runs was 18.4 pounds or .635 pounds, equal to .0836 gallons per horse-power hour. It was found in the test runs on ½ and 2/3 load that the consumption of fuel per horse-power hour remained practically stationary. During the tests the cooling water temperature did not go above hand heat and the consumption of lubricating oil was normal.

The Tuxham engine, various types of which are illustrated herewith, does not use a torch while running, the ignition taking place from the heat caused by the compression at the end of the return stroke of the piston. The carefully worked out governing apparatus for regulating the fuel supply makes it unnecessary for the operator to adjust either the air or fuel while the motor is running, all variations in load being taken care of by the governor. In this connection, the tests of the Tuxham at 209 Main street demonstrated that the sudden throwing in of the full load while the engine was running light only caused a variation of 3-1/3% in the revolutions and that the normal piston speed was regained almost instantaneously. One of the interesting structural details of this engine is the fact that the cylinders are offset so that when the piston is at its highest point and subject to the heaviest pressure, the crank pin has already passed the dead center. This simple departure from the ordinary engine construction results in a large saving in the wear and tear on pistons, cylinder walls and crank pins and at the same time permits of a greater value being secured from the power stroke of the piston.

The Tuxham semi-Diesel engines are built as marine motors in sizes ranging from 5 to 250 horsepower and in one, two or four cylinder units. They are equipped with automatic speed governors, with arrangements, also, for adjusting the revolutions by hand. The reversing is accomplished in the larger sized engines by means of compressed air (the action involved being similar to that employed in reversing a steam engine) and in the smaller marine types by means of reversing gear. In the very low powered motors for use in fishing boats, etc., a reversing propeller is often used, the motor running continually in one direction. This method does away entirely with reversing the engine, but involves a certain loss in backing power due to the decided drop in the efficiency of the propeller when reversed and for this

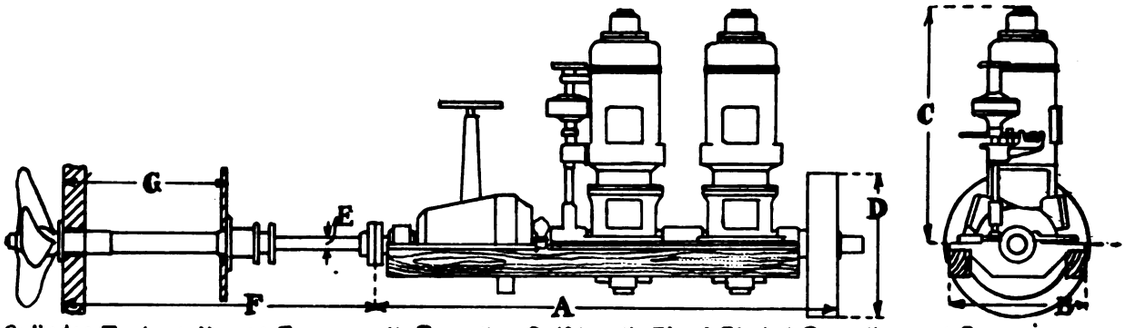


The standard one-cylinder engine.

reason finds favor only in craft where strong backing power is not highly important.

The reversing mechanism for compressed air consists of an air compressor directly coupled to the shaft, an air container with fittings, and a valve system with gear so arranged that when the engine is thrown over the compressed air is admitted to the

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2-Cylinder Tuxham Marine Engine with Propeller Outfit with Fixed Bladed Propeller and Reversing gear.

cylinder when the piston is in the proper working position to take up motion in the opposite direction. This method of reversing has been found very reliable. All the Tuxham motors, with the exception of the 5 horse-power units, are arranged to be started by compressed air. The one-cylinder Tuxhams range from 5 to 36 horse-power and from 600 to 350 r. p. m. and weigh from 175 to 160 pounds per horse-power. The two-cylinder type range from 14 to 110 horse-power and from 550 to 300 revolutions, while the weight varies from 150 to 135 pounds per horse-power. The four-cylinder motors are made in sizes varying from 72 to 250 horse-power run at from 425 to 300 revolutions and weigh from 115 to 100 pounds per H.-P.

In stationary practice the same scale of sizes is followed as in the marine type, the weight per horse-power varying somewhat, however, the land service engine being the lighter. The one- and two-cylinder stationary type motors have met with a wide adoption as dynamo drivers on board ship for the furnishing of power for lighting and auxiliaries. Their capacities range from 25 to 45 kw. and in this connection Messrs. Burmeister and Wain have installed them on many of their big motor ships.

The Tuxham Motor Company enjoys an extensive export trade and has found favor in many out of the way corners of the world. About eighteen months ago this concern was awarded the highest honors in competitive tests by the French Government, but as the Government would not purchase engines unless they were constructed in France, the Tuxham Company sold its patents and French rights to the well-known firm of Delaunay, Belleville.

The San Francisco representatives of the Tuxham motor report the recent sale to China of two large motor boats and of two 72 horse-power motors for sailing vessels in Portuguese East Africa.

At El Segundo, California, the violent storm of January 30th and February 1st tore away 1600 feet of the Standard Oil Company's wharf, entailing a loss of nearly $150,000.

Cannery men will be interested to learn that the Pacific American Fisheries' tender "Warrior," in which a 4 cylinder 120 H. P. Nlseco-Diesel engine was installed about a year ago, ran for their Excursion Inlet season, about 1000 hours, at a fuel cost of less than $200. The remarkable economy of the "Warrior's" engine has convinced the Pacific American Fisheries that their pioneering with the Diesel was the right move, and as the result this company will in future equip all of their vessels with Diesel engines.

The Bolinders Company of 30 Church street, New York City, has just published an interesting folder describing the Bolinder heavy crude oil marine engines. The description is direct, readable and simple and the accompanying diagrams make the simple workings of the Bolinder engine very readily grasped even by people who are not familiar with the design of semi-Diesel engines. Henry Lund and Company of San Francisco and Seattle are the agents of this engine for the Pacific Coast.

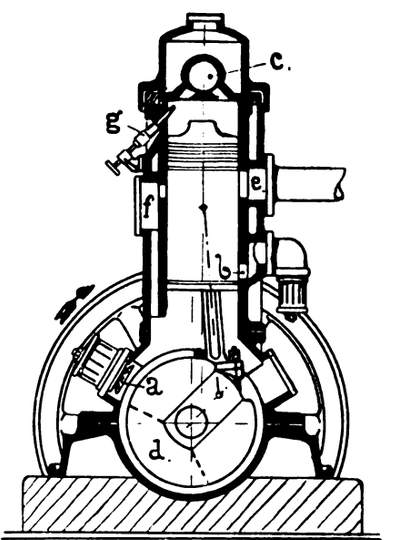
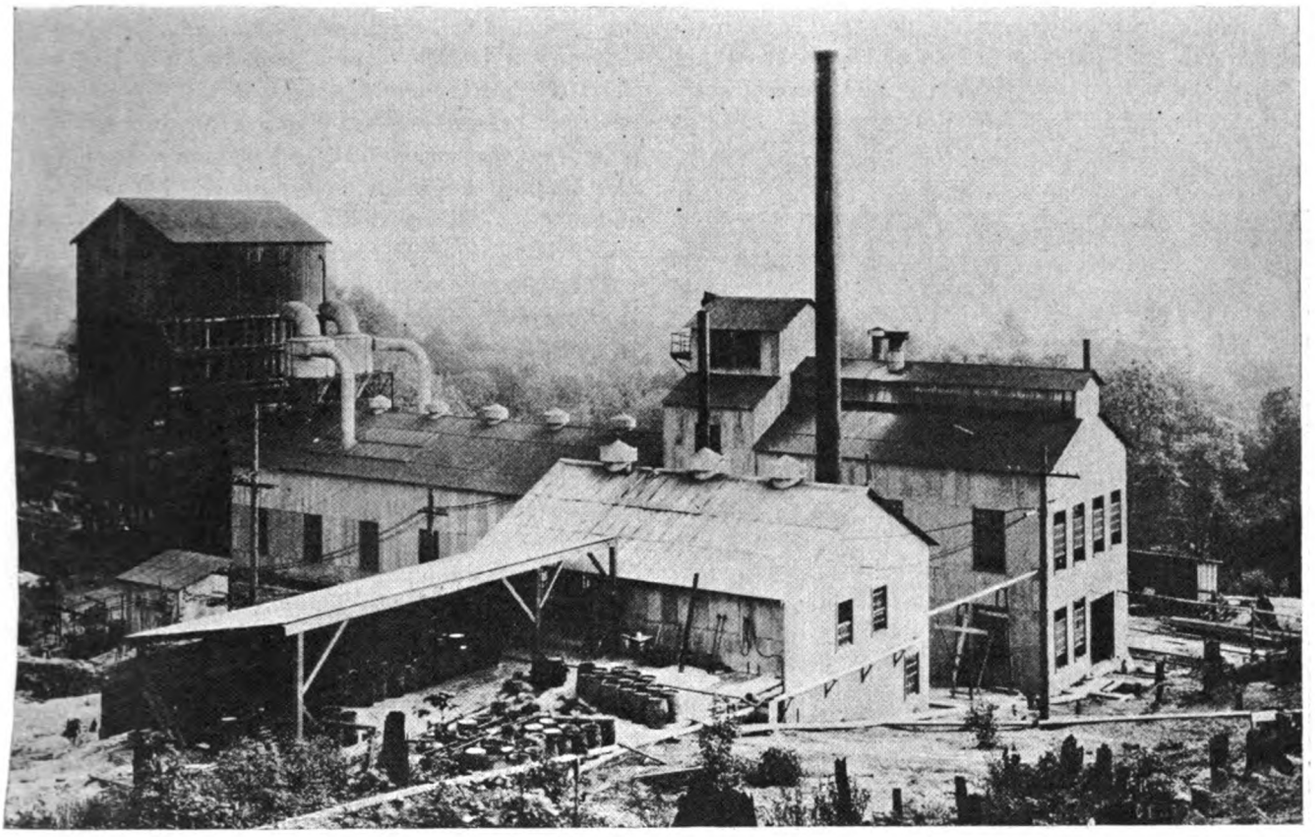


Fig 32. Tuxham-motoren

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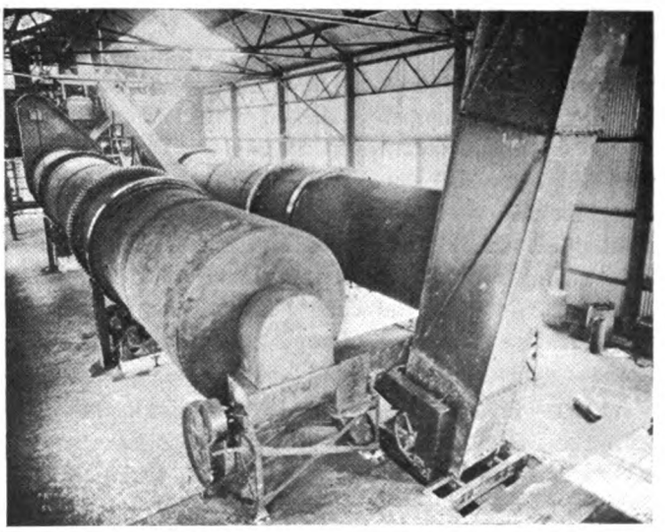
General view of the briquetting plant.

A New Maritime Fuel

TO THE marine shipping world the high efficiency of briquetted coals is thoroughly established, so it is a matter of wide interest on the Pacific Coast that a thoroughly modern coal briquetting plant of large capacity has been installed at *Seattle* for the benefit of both industrial and marine *interests*. This plant was completed late last fall by the Pacific Coast Coal Company, largest producer and marketer of coals in the far west, at a cost of $225,000. Right from the first its briquet products have met with a marked degree of favor, and officials of the company foresee the time in the not distant future when another unit must be added to enlarge the capacity of the plant.

Exhaustive tests show that briquets from the Pacific Coast Coal Company's plant mixed with Black Diamond steam coal, the well established product of the same company's Black Diamond mines, in Wash*ington,* provide a coal of splendid combustion quali*ties*—practically introducing a new fuel to coal burning vessels of the Pacific. This mixture is rapidly coming into wider use, on its evaporation record of 7½ pounds of water per pound of coal. The combustion is entire, the mixture burning without clinkering, and leaving but a surprisingly small quantity of ash.

The Pacific Coast Coal Company owns and operates seven coal mines in western Washington, one of them being the oldest coal mine opened in that State. The coal company's allied companies are the Pacific Coast Steamship Company, the Columbia & Puget Sound Railway and the Pacific Coast Railway, the last named being in California. The four companies have as their parent company the Pacific Coast Company, one of the big concerns of the west, the president being Mr. William M. Barnum, of New York City. Mr. J. C. Ford is vice-president of the Pacific Coast Company and president of the

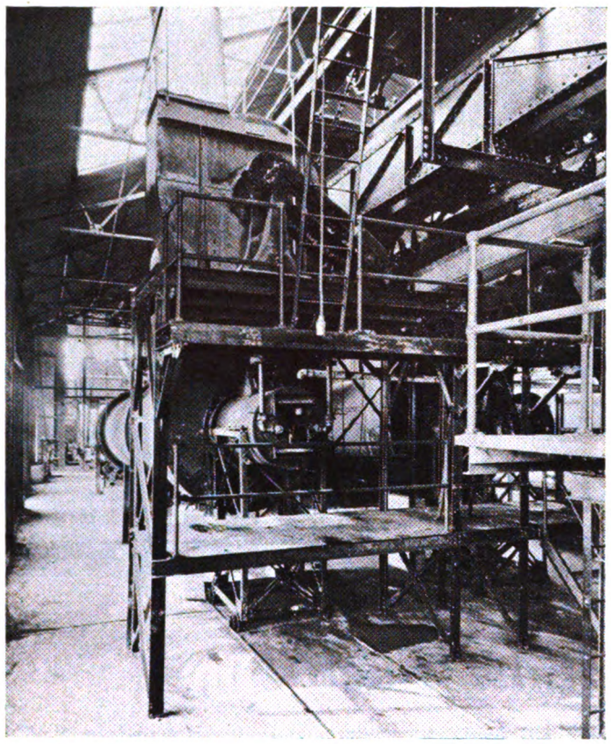


The discharge end of dryers.

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subsidiary organizations, while the coal company is under the active and very able management of Mr. Newton Poston as vice-president and general manager, assisted by Mr. I. W. Rodgers.

The Pacific Coast organization's interests in California are extremely heavy, and Pacific Coast Steamship boats are known all the way from Nome to San Diego. The Pacific Coast liner "Congress," plying between California and Puget Sound, is the largest passenger vessel engaged in coastwise service, with appointments and service that serve to spread the fame of her owning company, while the steamships "President" and "Governor" are big vessels of exceptionally fine type.



The dryers.

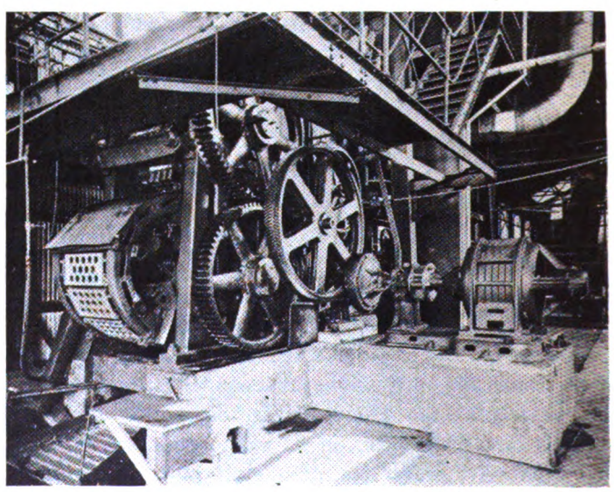
Experts and engineers from the Pacific Coast Coal Company spent months in studying modern briquetting before the company reached a decision regarding the style and location of the plant. The problem was the more efficient utilization of the fine coals from the different mines, especially the Black Diamond mine which produces a high grade of bituminous coal. Without briquetting facilities the purest richest portions of the coal veins disintegrate into fine particles, and much of their commercial value is lost.

As a result of the investigation, a contract was let with the Malcomson Briquet Engineering Company, of Chicago, for the installation of a plant similar in design to two others recently completed in the United States and regarded as the last word in briquet making plants—the other two plants being at Kansas City and at Duluth. These plants are provided with the Rutledge briquetting press, a vast improvement on other briquet presses, giving a pressure of 5,000 pounds to the square inch and making a briquet almost as hard as granite, and absolutely impervious to moisture. C. Komareck, inventor of the press, installed the Briquetville press in person.

This plant is located near the south end of Lake Washington, almost inside the city limits of Seattle. It consists of gravity bunkers, dryer house, press building and asphalt storage station, as well as a cooling belt that carries the briquets from the press to the storage bins and loading station 300 feet away. The plant is advantageously located with regard to transportation, as it is within easy access by rail of the mines, and is virtually located on tide water, for the Lake Washington canal will soon link Lake Washington with Puget Sound and the ocean. The plant is served by a branch line from the Columbia & Puget Sound Railway.

From the raw coal bunkers, which have a capacity of 400 tons, the coal passes through crushers and then through two cylindrical dryers nine feet in diameter and 65 feet long. Next the coal, hot from the dryers, is mixed in great fluxing chambers with heated asphalt—the asphalt being a new departure in the way of a binder for briquets. When the coal is thoroughly penetrated by the asphalt the mixture passes through the briquetting press at the rate of about 33 tons per hour, and on over the conveyor belt to the loading bunkers.

Asphalt is proving a splendid binder in making the briquets, as it holds the particles of coal together with a rigidity that keeps the briquet in shape until it is virtually all consumed by the process of combustion, adding as much as 10% heating efficiency and reducing smoke to a minimum.



The briquetting press.

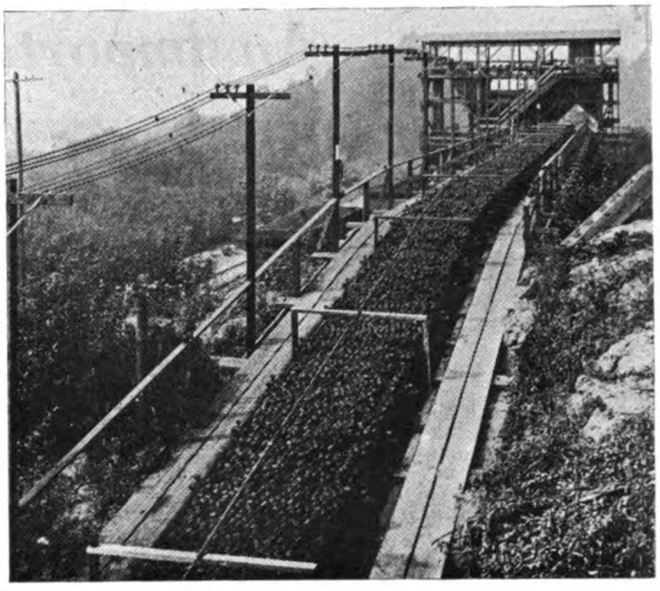
"Our briquetting plant is proving a great success,

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and with it we are offering the marine shipping world a fuel of peculiar excellence," said General Manager Poston to the PACIFIC MARINE REVIEW. "We are much pleased with the performance of the new plant, and are finding that the domestic coal market accepts its product with marked appreciation."

Up to March 1st there had been shipped from Portland—season of 1914 and 1915—11,844,653 bushels of wheat as against 11,131,754 bushels for the same period in 1913 and 1914. European shipments increased nearly 50%.

The Alaska Steamship Company recently purchased the steamer "Redondo" from the C. A. Smith Lumber Company of San Francisco. The "Redondo," which has a deadweight capacity of about 1500 tons and passenger accommodations for fifty, will be operated on the Alaska Peninsula route.



The coating belt.

Alaskan Coal Tests

In view of the great interest taken on this Coast in the search for some coal to do away with the necessity of shipping large amounts of Pocahontas coal to western Naval depots, the following extracts from a recent test of Matanuska Alaskan coal are of great interest:

Port test, seven days—All coal, ash and clinker were weighed, one boiler was used, forced draft was necessary on two days. Run-of-mine coal was used for five days, slack for one day, and lump coal for one day. There were no casualties. Coal burned very freely. Firing was very good, the analysis of flue gases giving rarely below 9 per cent. of CO2. There was little clinker, but the ash was several per cent. higher than with the Pocahontas coal. Draft was good and coal burned with bright yellowish flame. Coal coked very nicely; the coke was friable and very easily worked by the firemen. Fires six inches to eight inches thick were carried most of the time, although occasionally they were heavier. The ash fused into clinker on the grate bars; generally about two inches thick, medium weight, porous, a little tough and hard while hot but friable when cold. The clinker had a little ash mixed throughout the mass. It stuck a little to the bridge wall, but not seriously. The soot deposit was about 25 per cent. more than the Pocahontas coal. The soot was a little different from that of the Pocahontas as the granules appeared as minute fused grains. The load during this week of test would ordinarily have required two boilers burning Pocahontas coal.

Easy 20-Knot Run.

Four-hour forced draft—Fires thin; dampers partly closed. Fires burned brightly; work of firing very easy on account of ease of breaking up the coke. Furnaces one mass of yellowish flame. Not an excessive amount of ash formed. The men, on being questioned, all said it was the easiest 20-knot run they had ever made.

Twenty-four hour 15-knot test—Started with 12 boilers, but necessary to cut out four boilers to get the highest efficiency. Coal burned with greatest ease, forming a very easily worked coke, not an excessive amount of ash or clinker, and in general appeared easier to handle than Pocahontas coal. CO2 analysis generally high over 9 per cent. Fires, carried six inches to eight inches thick, were always glowing, ash pans bright, and the furnaces a mass of yellowish incandescent flame. Coal burned like pine knots. The amount of clinker was not excessive, was more or less easy to work and very friable when cold. Fires were noticeably hot. Amount of soot made was a little higher than is usually made by good Pocahontas coal, about 10 per cent. more.

Ten-knot test—Started with six boilers, but it was found necessary to cut out two boilers to give greatest efficiency. This power was more than ample, as at times there were four evaporators in use. Fires were very easily worked; the coke broke up easy; clinker was not very hard; bright, level fires from six inches to eight inches thick and sometimes thicker were carried and CO2 was generally high.

General remarks—There was very little foreign matter. The slack appeared to burn better than the lump. No evidences of gases being given off from the coal during the test. The noticeable characteristic of this coal is friability. Lumps pulverize very easily.

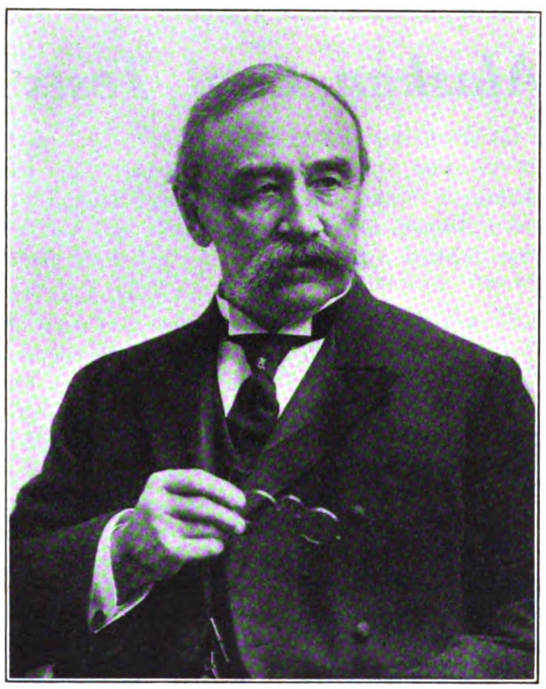
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An Important Merger

By CHAS. A. HARBAUGH.

The Act of Congress approved January 28, 1915, creating the United States Coast Guard, rang down the curtain upon the public life of one of the oldest and most widely known officials in the Government service in Washington. Reference is made to Sumner I. Kimball, organizer and developer of the country's life-saving service, and its general superintendent for nearly forty years past. The law in question, which amalgamated the life-saving establishment and the revenue cutter service, retires Mr. Kimball, at eighty years of age, upon three-quarters pay, after a continuous public service of fifty-three years.

Mr. Kimball's service in Washington began in 1861—while he was still in his twenties—when he gave up the practice of law in Boston to accept a clerkship in the office of the Second Auditor, known to-day as the Auditor for the War Department. He had already won some measure of distinction in public life, having served a term in the Legislature of his native State, Maine. So, if any of his acquaintances knew how little Uncle Sam had to offer the common run of his hired help in the way of official prestige or pecuniary reward, they must have regarded Kimball's change of vocation with feelings of disappointment.



Mr. Sumner I. Kimball.

And indeed, had the young man been like 999 of his fellow employees in the government service any such feelings entertained by his friends would have been fully justified. He would doubtless have gone to his daily tasks year in and year out, mediocre man to some more capable master, with the prospect of being dropped from the rolls in his helpless old age "for the good of the service."

Kimball, however, happened to be the digit that changes 999 into 1000. In a comparatively short time he was holding down the job of chief clerk of his office, giving instead of taking orders. His sphere was still more or less limited, but Opportunity was waiting just outside his door. His keen scent for certain office irregularities, and his already demonstrated ability as an organizer, finally attracted the favorable attention of the Secretary of the Treasury. It therefore transpired that in 1871, when the head of the Department found himself in need of a man to take charge of the Revenue Marine, his choice fell upon Kimball.

At the time mentioned the country had no life-saving service worthy the name. Boathouses, built under appropriations of Congress, had been placed upon the shores of Long Island and New Jersey as far back as the year 1847. Little more than huts, and designed only to shelter the primitive life-saving apparatus then in vogue, they had been permitted to go to rack. The custodians of this government property were in many cases irresponsible persons. They received no regular pay, and were more or less careless of their trust, permitting their neighbors to appropriate the contents of the buildings to uses entirely foreign to that of saving life and property from the sea. There were, moreover, no regularly employed boat crews. Whenever a ship came ashore the man who carried the key to the shelter nearest the scene of the disaster was supposed to assemble several volunteers and put off to the rescue. It sometimes happened, however, in such hour of dire calamity to the mariner, that crops needed attention or that fishing was particularly good.

Here was a field of endeavor peculiarly suited to the talents of the new chief of the Revenue Marine, and so well did he succeed in his work of organization and rehabilitation that on June 18, 1878 (by which time he had established a total of 148 life-saving stations and extended the service to all our sea and lake coasts), Congress divorced the life-saving bureau from the Revenue Marine and made of it a separate establishment. Mr. Kimball was of course placed at the head of the new service—a position he held uninterruptedly until the bureau was merged, along with the Revenue Cutter Service, into the Coast Guard.

Starting with a mere handful of boathouses, Mr. Kimball succeeded, in the face of many heart-breaking obstacles, in building up a service that, in point

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of efficiency and scope of operations, has never been equaled by any similar institution the world over. In relinquishing his office he hands over to the newly established Coast Guard an organization embracing upward of 300 well equipped life-saving stations, scattered over nearly 10,000 miles of coast and manned by a corps of skilled surfmen—a little army, trained, not to take life, but to save it. Witness its record of assistance given to 28,000 distressed vessels, carrying 180,000 persons, of whom only 1455 were lost—a less number than perished when the "Titanic" went down.

The seafaring world will be gratified to know that the Life-Saving Service has ceased to exist only in name. Joined to that other highly efficient life-and-property-saving branch of the Government, the late Revenue Cutter Service, with which it has heretofore co-operated so successfully in cases of shipwreck along our shores, the product of the two, under the name of the Coast Guard, will undoubtedly add new laurels to the splendid record made by each in the past.

In the years of Mr. Kimball's incumbency of the office of general superintendent of the Life-Saving Service his administration of affairs was ever menaced by the difficulty of keeping his stations manned by expert boatmen. As most of the work of the service was done in broken water adjacent to the shore, it was imperative that the boat crews be skilled surfmen. The crews were necessarily drawn from among the coast fishermen. But many of the best men of this class would not permanently ally themselves with a hazardous service that could offer them only the prospect of a summary separation from the pay-roll following incapacity consequent upon disease or injury incurred in the line of duty.

This menace grew more serious from year to year. For twenty years Mr. Kimball appealed to Congress to provide pensions for his boatmen. He asked in vain. Then in this year of grace 1915 comes the Coast Guard bill to passage, and with it a system of retirement pay for the life-saving corps, acceptable alike to the opponents of civil pensions and adequate to the necessities of the beneficiaries themselves.

Happily, Mr. Kimball has lived to see these soldiers of storm and surf come into their own. And there is equal cause for felicitation that Congress, while thus taridly recognizing the demands of a great humanitarian agency, has also conferred upon the venerable chief of the late life-saving establishment a distinction unique in this country—the bestowal of retirement pay, or a penson, call it whichever you please, upon a civilian.

A HANDBOOK OF THE COAST AND GEODETIC SURVEY.

The Department of Commerce has issued especially for distribution at the Panama-Pacific International Exposition, a pamphlet entitled "United States Coast and Geodetic Survey, Description of Its Work, Methods and Organization."

While this work is intended for the general reader, it also gives a concise account of the more important scientific features of the work of the Survey and of the improvements that have been made in recent years in instruments and methods. In the section relating to hydrography there is a description of the wire drag, an apparatus so valuable in discovering hidden dangers that escape detection by the ordinary method of sounding.

In the section relating to tides is a brief description of the improved tide-predicting machine which with one operator, predicts the tides for one year in advance for any port, and does the work of 100 men. To set the machine for any station and tabulate the tides for a year for any port takes not more than 12 hours.

In the article on base lines there is a description of the modern method of measurement with tapes of invar metal now used in the Survey to the exclusion of any other method. The invar metal is an alloy of nickel and steel, the advantage of which for this and many other purposes is that its rate of expansion and contraction under changes of temperature is about 1/25 that of steel, so that the important source of error due to temperature changes is practically eliminated.

Under the head of astronomy is a description of the Talcott method of observing latitude by means of which results of superior accuracy are attained. This method has long been used by the Survey in precise determinations. The instruments used in the determination of longitude by the telegraphic method are also described.

There are numerous illustrations of instruments and apparatus, parties at work in the field, etc., and maps showing the extent and character of the work.

When the Survey was begun under Ferdinand R. Hassler, the entire coast of the United States was on the Atlantic and Gulf of Mexico. The acquisition of California, Oregon and Washington, and later of Alaska, Porto Rico, Hawaii and the Philippine Islands, greatly extended the scope of the Survey and brought new problems to be solved. The extension of the triangulation into the interior so as to form a geodetic connection between the Atlantic and Pacific coasts; the extension of this system so as to furnish accurately located geographic positions and elevations in all parts of the United States; and the beginning of a systematic magnetic survey of the whole country, are among the important works that have been undertaken since the original plan of Hassler was adopted.

The publication may be obtained without charge from the Division of Publications, Department of Commerce.

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Pacific Coast Shipping Notes

PORTLAND.

The city of Portland as represented by its two greatest commercial organizations is doing its best to have a merchant marine commission formed at Washington. Mr. H. E. Pennell of the St. Johns Lumber Company started the ball rolling and he and Alfred Tucker, Portland maanger for the firm of Meyer, Wilson and Company and George M. Cornwall, publisher of the "Timberman," drew up the following bill which promptly received the endorsement of the Portland Chamber of Commerce:

Be it enacted by the Senate and House of Representatives of the United States, in Congress assembled:

That the President be and is hereby authorized and directed forthwith to appoint a commission to revise the shipping and navigation laws of the United States, and to draft a merchant marine code, which commission shall be composed of one ship owner, one licensed ship master, one licensed marine engineer, one unlicensed practical seaman, one marine underwriter, one exporting merchant, one merchant who ships coastwise by water or ships in inland waters, one American citizen who has acted as United States consul, vice consul or consular agent in a foreign seaport, one shipbuilder, one attorney at law who has had practice as a proctor in admiralty, one official of the United States Navigation Bureau, and one member of Congress, all members of said commission to be citizens of the United States.

It shall be the duty of the commission to give thorough and careful study to shipping and navigation laws of the United States, and to prepare as expeditiously as possible, recommendations for a complete revision of the existing shipping and navigation laws of the United States, and a draft of a merchant marine code. The commission shall at all times keep in view the necessity of placing the American merchant marine on a footing which will insure its development to such proportions as national interests demand and in keeping with the development of this country in other directions.

Said commission shall complete said report and draft code and present the same to the President within two years from the date of its organization. Such recommendations shall be laid before Congress by the President with a message at the earliest practical moment after their presentation.

The commission shall perfect its own organization by the election of a chairman and the appointment of a secretary, from within or without its number, and of such clerical and technical assistants as it may deem necessary.

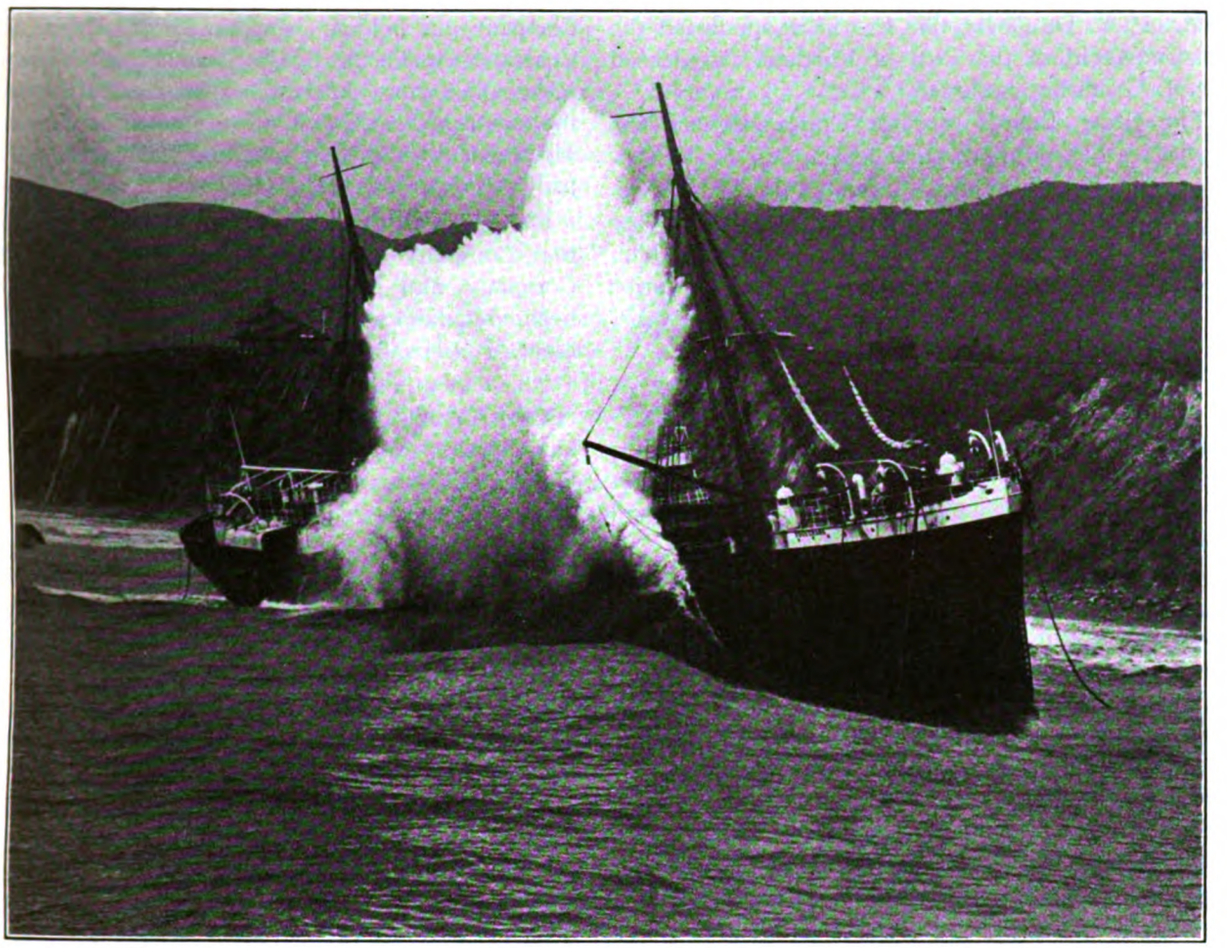
There shall be paid to each member $——— for each meeting which he shall attend, together with necessary traveling expenses, and subsistence while absent from his place of residence on business of the commission.

There is hereby appropriated for the purpose of this act the sum of $———.

The striking thing about the proposed commission is that it would know something about the matters it was investigating. This seems to be considered a fault in this country, but in our estimation it is an excellent thing. If reasonable care was exercised in choosing the men of which it was composed, such a commission could draw up a navigation code that would have a stimulating effect on American foreign trade. The proposal has been forwarded to Senator Chamberlin and the PACIFIC MARINE REVIEW trusts that he will be able to bring the matter to a head at the next session of Congress.

On February 25th occurred the death of Mr. Marcus Talbot, manager of the Port of Portland and one of the best known steamship and transportation men on the Pacific Coast. Marcus Talbot was a native of London, Ontario, and engaged in railroad work for many years before becoming connected with steamship concerns. He entered the service of the Pacific Coast Steamship Company at Seattle in 1896 and was shortly afterwards made chief clerk of that concern. In 1906 he went to Portland as superintendent of the Dalles, Portland and Astoria Navigation Company. In 1908 he returned to Seattle as manager of the Alaska-Pacific Steamship Company, a position from which he resigned on account of ill health in 1910. After an extended vacation, Mr. Talbot accepted the managership of the Port of Portland in October, 1911, a position which he held up to the time of his death.

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The steamer "Rosekrans" on shore near Gaviota, being struck by a heavy sea.



The old convict ship "Success" lying at Mission Street wharf, San Francisco.

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Mr. P. R. De Champlain has been appointed the Astoria agent of the Port of Portland to succeed Mr. J. G. Titley, resigned.

The State Board of Pilot Commissioners has granted a bar pilot's branch to Captain F. T. Sanders and a river branch to Captain John W. Brown.

The famous Columbia River steamer "Bailey Gatzert" is at the yards of the Willamette Iron and Steel Works, undergoing minor repairs prior to resuming her summer service on the Columbia on May 1.

The rate for Bull Run Water for shipping at Portland is now increased from 20 cents per thousand gallons with a minimum charge of one dollar to one dollar per thousand gallons for the first five thousand gallons and 20 cents per thousand gallons thereafter.

An additional story is to be built on the municipal boat landing at the foot of Stark street. This floor will be utilized for a drafting room and offices for the Commission of Public Docks.

Mr. C. C. Lacey has been appointed marine superintendent for the Great Northern Pacific Steamship Company and will make his headquarters at Portland.

The four-masted Belgian bark "Katanga," which sailed from Portland recently with a full cargo of wheat, has been the cause of considerable discussion. She arrived at Portland commanded by Captain Mark, a German. Apparently it was thought better to have a neutral captain in charge on the outward voyage, so Captain Mark was superseded by Captain O. Nilsen. Nilsen has commanded six ships owned by Thomas Falck of Stavenger, Norway, in whose service he has been for the past thirty-five years. Extensive repairs were made to the "Katanga" while in Portland, owing to the vessel having grounded in the Elbe when outward bound. The work was done by William Cornfoot.

SEATTLE.

On February 25 the Northwestern Fisheries Company's steamer "Ames" was launched at the yards of J. F. Duthie. The vessel, which will be operated as a tender for the Orca canneries near Cordova, Alaska, is 120 feet long, 30 feet beam and 5′ 1″ deep. She will be driven by two single cylinder engines the steam for which will be provided by a marine locomotive type boiler. The machinery for this vessel was built by the Willamette Iron and Steel Works of Portland.

Port Warden A. A. Paysse is having a complete wireless system installed in connection with his office in the North Pacific Pier No. 1 in order that communication may always be had with vessels in the harbor and those on their way to or from the port of Seattle.

William M. Barnum, president of the Pacific Coast Company, the holding company for the Pacific Coast Coal and the Pacific Coast Steamship Company and other allied coast interests, spent the early part of the month in Seattle and later came to San Francisco. Mr. Barnum is looking over the Pacific Coast Company's various interests.

On January 1st, the Border Line Transportation Company absorbed the Northland Steamship Company, and hereafter the steamship service of both companies will be operated under the management of Dodwell & Company.

The Northland Steamship Company was capitalized for $200,000. Mr. H. C. Strong of Ketchikan, Alaska, was president, Mr. C. H. Black, of the Seattle Hardware Company, vice-president, and Mr. H. C. Bradford, manager.

The Northland Steamship Company has operated a steamer service to Southeastern Alaska for several years. At the time of this transfer their boats in the trade consisted of the "Al-Ki" and "Northland." The "Al-Ki" has been running in the southeastern Alaska trade for nearly twenty years. This stanch old craft is a favorite with many regular travelers to and from the North.

The "Northland" is a steel vessel, carrying freight only. The "Al-Ki" has refrigerated space for 350 tons. The "Northland" has refrigerated space for 300 tons, and both these vessels have been heavy carriers of frozen fish southbound and fresh meats northbound.

The Border Line Transportation Company has heretofore operated on Puget Sound and as far north as the Powell River and Texada Island, B. C., but not to Alaska. This company will now operate three steamers in the Southeastern Alaska trade, as the "Despatch" will operate with the "Al-Ki" and the "Northland." The "Despatch" has a capacity for 1000 tons cargo and is being fitted up to carry 20 first class and 56 steerage passengers. Marconi wireless is being installed, and the vessel made especially adaptable to the cannery trade, and the West coast of the Prince of Wales Island route.

Under the consolidation, Mr. H. C. Bradford joins the new company as traffic manager. The officers of the Border Line Transportation Company are as follows: G. W. Ninemire, president; A. Stewart, vice-president; A. F. Haines, treasurer and manager; E. P. Erckenbach, assistant manager; H. C. Bradford, traffic manager; B. L. McMullen, freight agent; E. L. Matteson, passenger agent.

In addition to the three steamers on the southeastern Alaska run, the Border Line will continue to operate in the local freight service between Puget Sound and British Columbia with the steamers "Fulton" and "Wakena."

The firm of Dodwell & Company act as agents

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and practically control the Border Line Transportation Company. Dodwell & Company are not new in the Alaska field. They formerly operated the Washington & Alaska Steamship Company, and during the Klondike rush owned the steamer "City of Seattle," now belonging to the Pacific Coast Steamship Company. Dodwell & Company also operated to Cape Nome during the early rush at that point.

When they sold the seven steamships operated by the Washington & Alaska Steamship Company, it was provided that they would remain out of the Alaska transportation business for a period of ten years. This time has more than expired.

Dodwell & Company are also agents for the Blue Funnel Line, operating steamers in the Trans-Pacific trade, and commencing with the steamer "Moyune," which arrived at San Francisco February 3rd, have just inaugurated another line of Blue Funnel steamers to Europe via the Panama Canal.

H. B. Kirby, the boat builder, is at present busily engaged on a 70-ton cannery tender, three pile drivers for fish trap work, the hulls being 24 by 66 feet in size and with 70-foot gins, and also four 60-ton and three 75-ton fish barges.

In the annual appropriations for improvements at navy yards, the Puget Sound Government station gets $20,000 for the construction of a slip suitable for building submarines and $25,000 for the extension of the railroad system about the yard. The Ostrich Bay Naval Magazine, which comes under the supervision of the Navy Yard, gets $15,000 for a shell house, $20,000 for two magazine buildings, $4000 for store sheds, $2000 for a house on the pier, $4000 for an extension of the pier, and $3000 for a lighting system.

The steam schooner "Mukilteo" was launched at Raymond by Captain Andrew Peterson on March 12th. The "Mukilteo," which was built to the order of the Charles Nelson Company, is a wooden craft 225 feet long by 40 feet beam, with a lumber capacity of 1,400,000 board feet. On the 24th the "Mukilteo" left in tow for San Francisco, where her engines and boilers will be installed by the Union Iron Works.

The Kitsap County Transportation Company, who operate a fleet of passenger boats on suburban routes out of Seattle, will soon put their new Diesel-powered boat "Suquamish" on the Suquamish-Poulsbo run. The "Suquamish," the Kitsap Company's first Diesel-engined vessel, is the first of its kind in America. She is 92′ long, 16′ beam, 5′ in depth, and is powered with a 6 cylinder 180 H. P. Nlseco-Diesel engine of the 4 cycle type.

On a run around Bainbridge Island, a distance of 32 miles was covered in two hours, and the engine consumed about 18 gallons of fuel, or 9 gallons per hour, at a cost of 22c per hour. The "Suquamish" carries 180 passengers and is capable of a speed of 17 miles per hour.

SAN FRANCISCO.

The oil tanker "J. A. Moffat," built by the Union Iron Works for the Standard Oil Company, underwent successful trials on March 1. The "Moffat" is 423 feet long, 65,000 barrels capacity, and cost $875,000. She is the third large tanker recently turned out by the Union Iron Works, having followed the "Frank H. Buck" and the "Lyman Stewart." The "Moffat" is radically different from the two boats which preceded her. After her trials the new tanker proceeded to Point Richmond, where a cargo of oil was taken on board.

A death which has been keenly felt in marine engineering circles is that of Harry Russel, the well-known general sales manager of the General Electric Company at San Francisco. His death occurred on February 22nd and was due to heart failure. Mr. Russel had handled the business of the General Electric in San Francisco for the past twenty years and lately had become keenly interested in the electric drive as applied to the Navy collier "Jupiter," and was doing a great deal of missionary work in bringing the advantages of this mode of transferring power to the attention of shipowners and marine engineers up and down the coast.

The schooners "Encore" and "Wm. F. Garms" of 572 and 972 net tons respectively, and the barges "Edna May," 859 tons, and the "Electra," 989 tons, have become the property of the Rolph Navigation and Coal Company.

Martin F. Tarpey, formerly first officer of the Pacific Coast Steamship Company's steamer "Congress," is now commander of the "Queen" of the same line, relieving Captain Thomas Riley, who is absent on sick leave.

The forerunner of the visitors to the Panama-Pacific Exposition among Seattle's pleasure craft is the 65-footer "Tango," which was brought down from the north by her owners, Captain H. Lindstrom and Mr. Charles Johnson, who were accompanied by Mr. J. M. Chisholm of the Union Oil Company. The "Tango" is a sturdy, serviceable craft with 75 horsepower heavy duty engines.

Two steel oil barges were launched at Mare Island navy yard during March. The appropriation for these barges was $70,000 each. The navy yard has been asked to submit bids on another fuel ship and a destroyer, so that work will be plentiful at Mare Island for the next year or two.

Mr. Frank Bollam has been appointed Portland agent for the Pacific Coast Steamship Company, and tickets and freight bookings can now be secured direct from Portland to Alaska points.

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New York Notes

THE "Foohng Suey," a four-masted bark formerly well known on the Pacific Coast, was sold recently in New York by the Texas Company and is now being used as a coal barge in Long Island Sound. The vessel was built in 1888 in Glasgow, Scotland, for a firm in Honolulu and until the Islands were annexed by the United States she flew the Hawaiian flag. Later she was placed under American registry.

The "Foohng Suey" was named after a prominent Honolulu merchant and for many years she plied in the sugar trade between the Islands and Atlantic coast ports. Aside from her trim, yacht-like appearance, the bark was noted for the fact that she was sent down the ways at the time of her launching by Queen Victoria. A bronze plate in the "Foohng Suey's" cabin testified to this fact.

One of the most intrepid of Yankee skippers—Captain John E. Willett, of New Hampshire—commanded the "Foohng Suey" for many years. Late in December, 1913, the "Foohng Suey" cleared from Philadelphia for New Orleans with a cargo of coal. She experienced a succession of strong gales off the Virginian Capes and was dismasted. After having been blown a thousand miles off her course, she was little more than a derelict when picked up and towed into New York. Since then and until her sale recently she had been lying at a pier in New York Harbor.

The high level of rates prevailing on the East Coast because of the scarcity of steamers will be the stimulus for transferring a large amount of Great Lake tonnage to the Atlantic trade during the coming spring. The transfer will begin, it is said, as soon as navigation opens in the Great Lakes, and among the first vessels to be sent through will be a dozen or more now under charter to the Canada Steamship lines. Several of the vessels will be used in the coal trade between Philadelphia and the West Indies.

Statistics compiled recently by the New York Journal of Commerce showed that a total of 235 vessels, of 515,783 gross tonnage, had been destroyed by various means as the result of hostilities from August 1 to February 25.

In a report submitted to the Liverpool and London War Risks Association, J. Bruce Ismay, chairman, declared that shipping valued at $400,000,000 had been entered with the association and of this ships to the value of $4,250,000 and cargoes valued at $22,500,000 had been destroyed. The following tabulation gives the number of vessels lost by each country:

Great Britain	142
Germany	30
France	7
Denmark	7
Austria	4
Sweden	9
Persia	1
Italy	1
United States	3
Spain	1
Holland	7
Roumania	1
Turkey	6
Greece	1
Norway	13
Total	235

While yachtsmen of New York, Philadelphia and Boston are displaying but slight interest in the proposed motor boat race between New York and San Francisco for which prizes are offered by the Panama-Pacific Exposition, their brethren in Baltimore are allowing their enthusiasm to run full tilt.

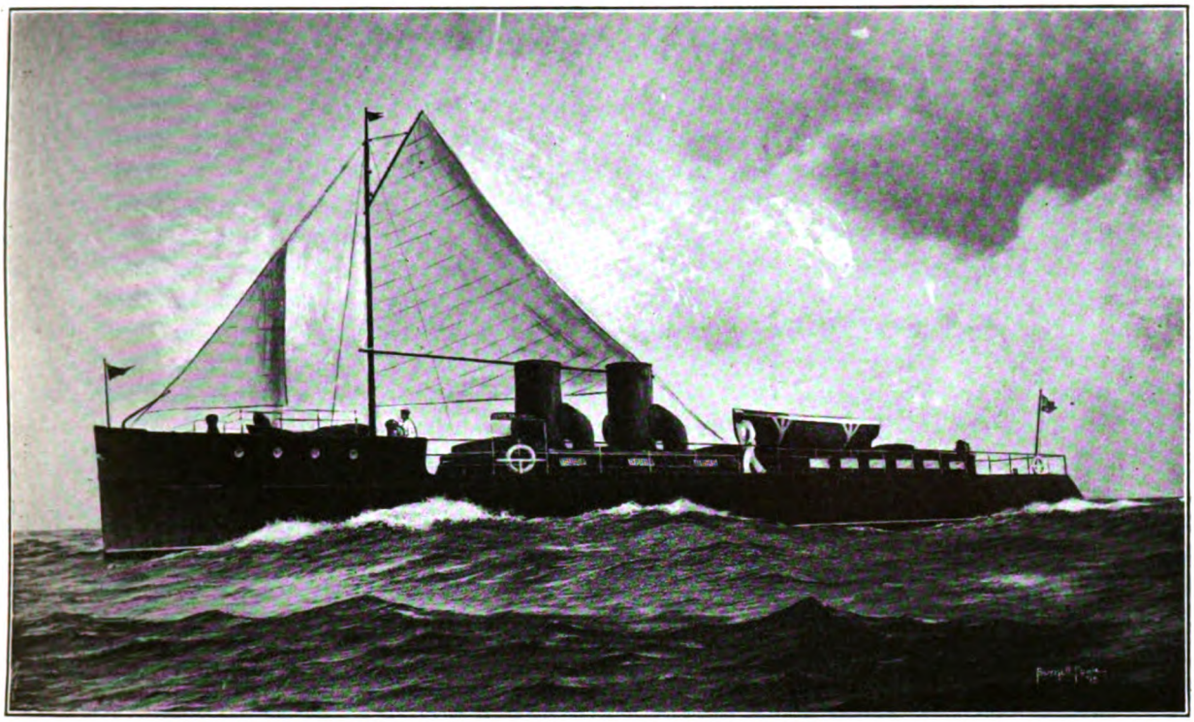
Baltimore is to be represented in the race by a motor boat which is to be known as the "Lady Baltimore" and which is now under construction at the yard of the Mathis Yacht Building Company at Camden, N. J. It is expected that she will be launched May 15. The course now proposed covers a distance of six thousand miles and the race is scheduled to start from Sandy Hook on October 5, 1915.

The official course has not met with the entire satisfaction of the yachtsmen and others interested in the race. It calls for stops at Charleston and Key West, thence the boats will round the westerly edge of Cuba and head for Colon. Experienced navigators say the desirable course is to the easterly end of Cuba, thence by way of the Windward passage to Colon. The time of year selected for the race is also meeting with some objection as it is one in which hurricanes are said to be of frequent occurrence.

Shipping men were greatly interested in the arrival here on February 27 of the new Transatlantica Italiana liner Dante Alighieri, originally built to ply between Italy and South America, but placed on the New York run because of the heavy freight and passenger business which now rule to Mediterranean ports.

The leading characteristics of the Dante Alighieri are as follows: Length, 480 feet; breadth, 59 feet; depth to lower deck, 38 feet; coefficient of fineness

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The "Lady Baltimore," the Baltimore Yacht Club's entry for the New York-San Francisco motor boat race.

at 24 feet of immersion, about 0.625; cargo capacity, 5,000 tons; loaded draught, 24 feet; displacement, 16,000 tons; gross register, 10,000 tons. The passenger accommodations are 92 first, 126 second, 136 third and 1,700 steerage.

The propelling machinery is of the twin-screw, quadruple expansion type, balanced on the Schlick system, and giving a speed of sixteen knots in service on 8,000 horsepower. The equipment is in accordance with the Italian, German, British and Australian laws. The hull is of Siemens-Martin steel with framing on Lloyd's open floor system. There is a continuous double bottom, water tight longitudinal and transversal bulkheads and all steam pipes are led through a tunnel. The life-saving apparatus consists of 20 standard lifeboats under Welin davits and 18 Engelhardt collapsible boats.

At the invitation of Phelps Brothers, agents for the Transatlantica Italiana Line, more than one hundred guests inspected the Dante Alighieri from 4 to 7 o'clock, Thursday afternoon, March 4. The inspection was followed by a dinner served in the main saloon of the vessel.

The non-magnetic yacht Carnegie, with a large party of scientists on board, left New York on March 4 en route on one of the most comprehensive cruises since she was placed in commission in 1910 by the Carnegie Institution at Washington. Observations on magnetic variations will be made by the scientists.

The present cruise will take the Carnegie through the Panama Canal and thence in leisurely fashion up the coast to San Francisco where she will be fitted out for a long stay in the Arctic Circle. She will probably fit out again at some Japanese port and proceed to the southern extremity of the globe on the last leg of her cruise before returning to New York. Captain Ault is in command of the vessel. The cruise will last from two to three years.

Shilbuilding yards along the Atlantic seaboard are now experiencing one of the busiest and most profitable periods since the heyday of American shipping prior to the Civil War. Eighteen passenger and cargo vessels are now under construction and orders for as many more are pending. The increased building program for the United States Navy has also worked to the material advantage of the shipbuilders.

The William Cramp and Sons Ship and Engine Company, of Philadelphia, has been awarded the contract for a cargo vessel by W. R. Grace and Company. It will be of the same size and type of the "Santa Clara," "Santa Catalina," "Santa Cecilia" and "Santa Cruz," all built and completed within the last two years by the Cramps and now in service between New York and San Francisco, via the Panama Canal. They are of about 4,000 net tonnage and 400 feet in length. The new vessel will be finished in ten months and will also be placed in the New York-San Francisco trade.

An official of the line, in an interview with the representative of the PACIFIC MARINE REVIEW, declared that additional vessels of the same type would be ordered if the present upward trend in the intercoastal trade continues long. A regular passenger service is also contemplated, he added, but no definite arrangements toward this end will be made until the early summer months.

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Shipping Notes

The present struggle in Europe has served to increase Russia's desires for better ocean communication with the outside world. A new line of railroad connecting Kem, an ice free port on the White Sea, with Petrograd is now being built.

Congress has made an appropriation of $250,000 to cover the construction of a new lighthouse tender to be named the "Cedar." The new craft is to replace the "Armeria" on the Alaska district. The "Cedar" will be a decided advance in this class of vessel, being both larger and more powerful than any of her predecessors.

Captain Andrew Peterson, the shipbuilder of Raymond, who is building a steam schooner for the Charles Nelson Company of San Francisco, is reported to be considering the removal of his plant to South Bend, Washington.

In order to comply with the pledge made to the people of Wilmington when that section was annexed to Los Angeles, it is expected that the latter city will issue bonds to the extent of $4,500,000 to be spent on wharfage facilities, terminals, a dry dock and warehouses in order that all of the work started during the past eight years may be fully available for shipping. If the bond issue carries it will bring Los Angeles' harbor expenditures up to about $11,000,000.

An unique salving venture is that being undertaken by C. F. Stager of Port Townsend, who will attempt to remove the brass fittings and cannon from the old Russian sloop of war "Neva," which was sunk near Sitka, Alaska, 102 years ago. Rumor has it that there was between $150,000 and $200,000 in gold on the "Neva," but Stager considers the gold a doubtful quantity and is counting upon the brass to pay him for his trouble and expense.

The Charles R. McCormick Lumber Company is to enter the New York lumber market with Oregon fir. A branch selling agency has been established on the Eastern seaboard and the steamer "St. Helens" is now loading with the first consignment of lumber, 1,500,000 feet of fir.

Definite announcement has been made of the inauguration of the Panama-Pacific Line on May 1st, on which day the American Mercantile Company's steamer "Kroonland" will leave New York for San Francisco, to be followed two weeks later by her sister ship the "Finland." Swayne and Hoyt, one of the oldest and most widely known and respected shipping firms in San Francisco, will act as freight and operating agents for the new line. The passenger department on Geary street, opposite the St. Francis Hotel, will still be maintained, however. The "Kroonland" and "Finland" were constructed for the trans-Atlantic trade by the Wm. Cramp Ship and Engine Building Works, and are 560 feet long, 60 feet beam and 38 feet moulded depth. They each have accommodations for 500 first and 400 third-class passengers, in addition to large freight capacities.

The latest United States battleship to take the water was the "Pennsylvania," which was launched at the yards of the Newport News Shipbuilding and Dry Dock Company on March 16. The new craft is 625 feet long by 97 feet beam and has a load displacement of 32,500 tons. She is to carry twelve 14-inch guns and her main armor defense consists of a wide belt, 18 feet, which extends for a considerable distance below the load water line. This belt is to be 14 inches thick amidships.

The Shipping Federation of Canada at its recent annual meeting elected the following officers: Andrew A. Allan, president; J. R. Binning, treasurer, and E. W. Foulds, assistant treasurer. The Executive Council of the Federation is now composed of Messrs. Andrew A. Allan, J. R. Binning, D. W. Campbell, W. R. Eakin, R. W. Reford, John Torrance and A. Mackenzie. The following representatives of the respective steamship lines were elected:

Allan Line, Messrs. Andrew A. Allan and W. A. Wainwright; White Star-Dominion, Canada and Cie Generale Transatlantique Lines, Messrs. John Torrance, P. V. G. Mitchell and W. Macpherson; Cunard, Donaldson, Thomson and Cairn Lines, Messrs. R. W. Reford and W. I. Gear; Manchester and Furness Lines, Messrs. J. R. Binning and J. W. Nicoll; New Zealand Shipping Company's Lines, Messrs. E. W. Foulds and V. A. Ward; Messrs. Elder, Dempster and Co., Ltd., Mr. D. W. Campbell; Canadian Northern Steamships Lines, Messrs. R. C. Vaughan and Guy Tombs; Head Line, Messrs. W. R. Eakin and A. L. Francis; Dominion Coal Company, Messrs. A. Mackenzie and A. Dick; and Nova Scotia Steel and Coal Company, Lorne C. Webster.

The president of the Federation in his annual report pointed out that the total line tonnage in the Federation amounted to 840,188 tons, an increase of 206,966 tons over last year, and that the tramp tonnage amounted to 340,940 tons, an increase of 249,337 tons over 1913.

The two new vessels now under construction in Great Britain for the Atlantic service of the Canadian Pacific Railroad are to be named the "Melita" and the "Minnedosa." These vessels will be of the one-cabin type similar to the "Missanabie" and the "Metagama," and will have accommodations for 500 cabin and 1,500 third-class passengers.

The two new American Line steamers for service between Sweden and the United States will have a

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The salving of the "Mina Brea" near Antofagasta, Chile.

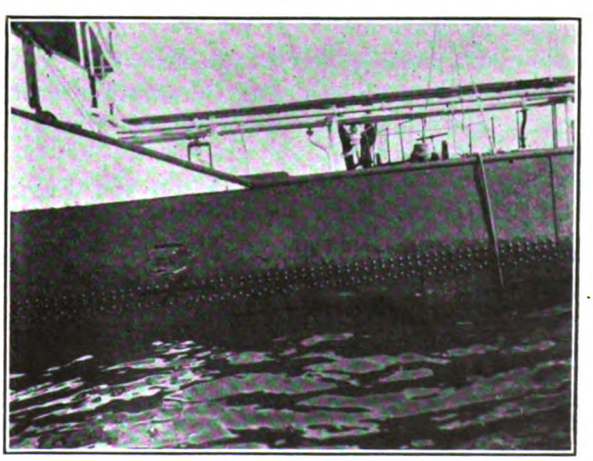
length of 500 feet, 64 feet beam and a depth to upper deck of 42 feet. A sea speed of 19 knots is expected. The vessels will have a dead weight capacity of 12,500 tons and accommodations for 250 first, 750 second and 750 third class passengers.

For the following particulars of a very interesting salvage job we are indebted to Barnett and Company of Antofagasta, Chile:

This oil tanker grounded on a shoal known as Lagarto Bank, which lies about ten miles north of the northern extremity of Antofagasta Bay (Tetus Point), while on the voyage between Tocopilla and Antofagasta. The vessel entered the bay early in the morning of September 19 with her siren going, calling for assistance. Tugs with high capacity pumps were sent off and moored alongside, and the water in the flooded compartments was kept down. Divers reported very extensive damage to the vessel's bottom and, after a number of the lesser holes had been stopped, the salvors (Messrs. Orchard Brothers, iron and steel founders and manufacturers of Antofagasta), erected an air compressor plant on the vessel's deck and she was quickly raised. Some further temporary repairs were effected on the bottom of the "Mina Brea," a spare compressor placed on board and she left for Talcahuano on October 23, arriving at that port on the 28th of the same month. This trip was made with a hole 3′ 6″ in length and over two feet in width in the vessel's bottom, but it was found that the water was held back without difficulty by the compressed air. The "Mina Brea" effected repairs and then proceeded to San Francisco.

The big steel suction hopper dredge "Absecon" has been turned over to the Army engineers by her builders, the Ellicott Machine Corporation of Baltimore, and has been put into operation at Absecon, New Jersey, to work on the new Atlantic City channel.

The Bath Iron Works of Bath, Maine, are con-



The cross marks the deck line and shows what little reserve buoyancy the "Mina Brea" had left.

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structing a 225-foot steam yacht for Peter W. Rouss. The craft will be an oil burner and will be driven by turbine machinery.

The superdreadnaught "Pennsylvania" was launched at the Newport News Shipbuilding and Dry Dock Company on March 16. The "Pennsylvania" is 600 feet long, 97 feet beam and has a displacement of 32,400 tons. She carries twelve 14" guns arranged in four turrets, twenty-two 5" quick firers and four 21" torpedo tubes. Her complement includes 65 officers and 1160 men.



The "Mina Brea" as she appeared when raised by compressed air.

The United States destroyer tender "Melville," named for the late Admiral George W. Melville, who probably accomplished more for the advance of the American Navy than any one man, was launched at the yards of the New York Shipbuilding Company on March 3. The general dimensions of the "Melville" are 400 by 54 by 36½ feet, and she is designed to accompany torpedo flotillas as a repair and supply ship.

The contracts for light vessels 101 and 102 have been let to the Pusey & Jones Company of Wilmington, Delaware, for $187,398. The new craft will be constructed of steel and will be single screw, oil engine propelled and of the following dimensions: 101′ 10″ over all, 92′ 3″ on the water line, and 25′ 0″ beam.

Two new submarines were launched at the yards of the Fore River Shipbuilding Corporation during March. The "L-3" took the water on March 15 and the "L-4" on March 29.

The William Cramp & Sons Ship and Engine Building Company have secured the contract for another Grace steamer to be a sistership of the "Santa Cruz," "Santa Clara," "Santa Catalina" and "Santa Cecilia." It is understood that should the coast to coast business warrant, two more of these vessels will be built in the near future which will make a total of seven steamers of the "Santa" class in the Grace fleet.

John Craig, Sr., of Toledo, Ohio, father of John F. Craig and George L. Craig, proprietors of the Craig Shipbuilding Company of Long Beach, was a recent visitor to San Francisco. Mr. Craig was returning to his home in the East after a visit to southern California.

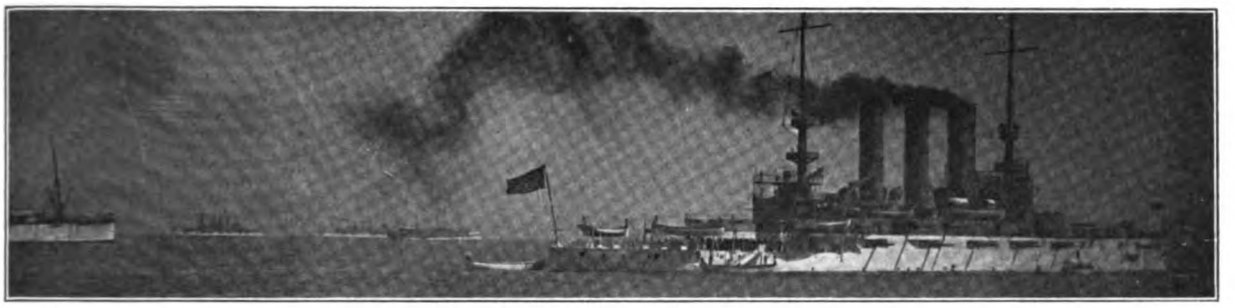
Mr. Anton A. Raven's recent retirement from active duty in the ranks of the Atlantic Mutual Insurance Company management and his acceptance of the chairmanship of the Board of Directors is a fitting close to a long and eventful career covering sixty-three years' connection with one concern. Mr. Raven entered the Atlantic Mutual offices in 1852 at the age of 19 in the capacity of a clerk. Forty-one years ago he became fourth vice-president and soon after third vice-president. Twenty years later found him filling a vacancy as second vice-president, and in 1895 he was again advanced while in 1897 he became president, a position he held continuously up to the time of his recent retirement to the chairmanship of the board. Mr. Raven is eighty-two years of age but in splendid health, and his company are counting on his voice being heard in their councils for many years yet. The presidency of the company is now held by Mr. Cornelius Eldert, who has been forty-nine years with the concern.

The 2500 horse-power Diesel engines building at the New York Navy Yard for the Navy Oil Tanker "Maumee" are expected to be ready for shop trials some time in May. The "Maumee" is being constructed at Mare Island Navy Yard and is now ready for her machinery. The "Kanawha," a sister ship fitted with reciprocating engines, was constructed at the local government yard in very creditable time, but owing to the indefinite length of time that may be consumed in Government tests of the machinery at the New York Navy Yard, the "Maumee" will probably not go into commission much before 1916.

The Canadian Pacific steamers are hereafter to be conducted by a separate organization known as the Canadian Pacific Ocean Services, Limited. The purposes of the new organization are purely financial, the idea being that the Canadian Pacific steamship lines will issue their own bonds and take care of their own extensions of service independent of the owning railroad company.

The oil tanker "La Habra," of the Union Oil Company, which caught fire in mid-Atlantic some weeks ago, succeeded in making Fayal, in the Azores, where temporory repairs were effected and the vessel proceeded to her destination, London. The damage is reported to have been considerable, especially to the living quarters on board.

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European Marine Notes

[From our own Correspondent.]

The Panama Route and Great Britain.

More and more attention is being drawn in this country to the advantage of the Panama route to the Pacific Coast for Vancouver and all other ports north of Panama and the West coast of North America. The canal means a reduction of about six thousand miles to Liverpool and the fact is being well driven home to those whom it may concern in this country. Accepting the European war as a common occurrence of every day life people over here are fixing their traveling accordingly, and many will go to the Panama Exposition via the canal, whilst others will use the new Canadian route rendered possible by the completion of the Grand Trunk Pacific line to Prince Rupert. The opening of this new transcontinental line knocks two days off the journey from London, and is expected to be followed by direct steam communication with Australia and New Zealand. F. C. Salter, the European manager of this line, is hard at work booming his route but the steamship companies are keeping up their end well with the competing advantages of the canal way.

Shipping and the German Threat.

British shipowners continue to be unmoved by the German submarine threat. They will not be surprised if some more innocent lives and a certain amount of property are lost, but they have complete confidence in the ability of the Navy to cope with the danger, and probably not a single owner believes that the steady flow of British oversea commerce will be seriously interrupted. At the moment rather firmer insurance rates are being quoted on the cargo of vessels due shortly to arrive off this country, but that is mainly because directly a prudent underwriter decides to limit his line and reinsure the natural tendency of rates is to harden. All premiums are still on a very low level, and the existence of the State War Insurance scheme, to which the Chamber of Shipping is to pay a well-deserved tribute in a resolution at the forthcoming meeting, is a guarantee that insurance will always be obtainable on very moderate terms.

A Shipping Company's War Experience.

There seems to be a prevalent idea at the present time that British steamship owners have been making fabulous profits since the commencement of the war and are rapidly qualifying for the payment of super-tax on their incomes. An ounce of fact is worth a ton of fancy, and the reverse of the medal is shown by the report of the Mercantile Steamship Company for the year ended 31st December last, which is just to hand. The accounts, of course, cover five months working under war conditions, and the result is a substantial decrease in profits as compared with the preceding twelve months, the net earnings on completed voyages and insurance being $430,500, as compared with $621,000 in 1913. In consequence the dividend is reduced from 20 to 17½ per cent., and only $105,000 is set aside to the reserve fund as against $275,500 a year ago. The company has certainly been unfortunate, two of its steamers having been sunk by the German commerce destroyers, while a third is locked up in Petrograd, and will apparently have to remain there until the conclusion of hostilities. The vessels sunk were insured, and to replace them two new ships have been contracted for, which will be delivered early in the summer, but in the meantime the company is less able to take advantage of the high freights now ruling. As the directors point out, it was only in the latter part of the autumn that shipping freights began to move forward, and while old contracts were satisfactory, those made and fulfilled during the year resulted in meager profits and some in actual losses, the latter chiefly caused by the unexpected cost of war insurance and the sudden rise in the cost of coal abroad caused by the war.

Increased Working Costs.

There is some difficulty in estimating the amount of the additional expenses due to the war, owing to the varied lengths and conditions of voyage. But owners agree that the delays in port detract very much from profits. For instance, the time

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required for a round voyage of a cargo steamer to the United States and back may normally be taken to be about 50 days. At present 75 days might well be required. A surplus of, say $7,500, if spread over 50 days, would amount to $150 a day, but if spread over 75 days to only $100 a day. And expenses and earnings are usually calculated per day. Wages of crews have risen by 50 per cent. and coals in the Mediterranean and Atlantic island ports by nearly 100 per cent. Whereas $6.25 was accepted before the war now $11.25 or $11.84 has to be paid. In many cases stores have risen by from 25 to 30 per cent.

Limitation of Shipping Profits.

The question of limiting profits earned on shipping in war time, raised by Bonar Law in the British House of Commons on February 12th is one that has frequently been discussed by owners themselves. Representative cargo steamship owners have frankly admitted that certain of the freights lately paid have yielded too large a profit, and they would have been glad to see them lower. But it has been and is still extremely difficult to suggest how this could be brought about by artificial means without causing serious dislocation of very complicated machinery.

While some of the rates have admittedly been high, others have only been moderately so in view of greater length of voyages and increased expenses. Further, even the largest freights earned by British owners have been surpassed by those received by neutrals. It is mainly to the practical steps described by Premier Asquith that shipowners look for redress. The clearance of congestion at the ports and the use of enemy ships are two of the principal measures. Undoubtedly, too, there is a feeling that if the experience of shipowners were utilized in the management of the many hundreds of merchant ships acquired by the Government, there might be a saving in the great number now in use. It should be remembered that a large proportion of some fleets has been requisitioned by the Government, and that the earnings on such ships are already strictly limited.

Shipbuilding in Spain.

Shipbuilding yards for merchant vessels are now being built at Bilbao by the Spanish Naval Construction Company in which the three British firms of Sir W. G. Armstrong, Whitworth & Co., John Brown & Co., and Vickers, are interested. Forty per cent. of the capital of the company is owned by these three firms and 60 per cent. by Spanish shareholders. For the past five years the Naval Construction Company has been doing Government work at the arsenals at Ferrol and Cartagena, but the new scheme is entirely a private enterprise. Among the first merchant ships to be built will be 20 liners for the Transatlantic Company of Spain. These vessels are to be rather larger than the fine liners "Infanta Isabel de Bourbon" and the "Reina Victoria-Eugenia," each of about 10,000 tons, which were recently built in this country for the line.

Furness-Houlder Argentine Lines.

It is some comment on the German "blockade" of Great Britain that the day on which it was supposed to come into force was also marked by the appearance of the prospectus of an important new shipping company, that of the new Furness-Houlder Argentine Lines, Ltd. The company has a share capital of $5,000,000, in shares of $5 each, of which 400,000 have been allotted for cash at par, and the remaining 600,000 are held in reserve. The offer to the public consisted of $2,500,000 five per cent. First Mortgage Debentures, at 95. The Debentures are secured, in addition to a general floating charge, by a specific first mortgage on five twin-screw refrigerating steamers which are to be built for the Argentine trade and for which contracts have been placed at a total cost of $4,465,000. Furness Withy and Co., and Houlder Bros. and Co., have obtained various contracts with some of the principal meat companies operating in the Argentine and Uruguay for the conveyance of their produce for a period of ten years from December next, by which time it is hoped that the new vessels will be ready for sea. In conjunction with four twin-screw steamers to be provided by the Royal Mail and the Royal Mail Steam Packet Meat Transports, Ltd., it is intended to provide a weekly service between the Argentine, and on the basis of the contracts a trading profit of over $550,000 per annum is estimated.

Indian Shipping Freights.

I hear that the Indian shipping lines have virtually decided not to make any freight contracts for a longer period ahead than two months. This policy will enable them at any moment to give notice of increased freights to take effect all round two months after date. They will also safeguard themselves against the abuse of this regulation by presenting to shippers who have booked cargo a demand for the freight on any portion of the booking that is short shipped. That there will be further advances admits of no doubt, and it will be impossible for firms to continue the practice of covering all their freight requirements at current freights for prolonged periods such as six or twelve months. Similar regulations are in contemplation for other markets, and it would seem desirable for manufacturers who are accustomed to sell their export goods on a c. i. f. basis to protect themselves against unexpected freight advances.

Chino-Japanese Shipping Rivalry.

At the moment I understand there is a good

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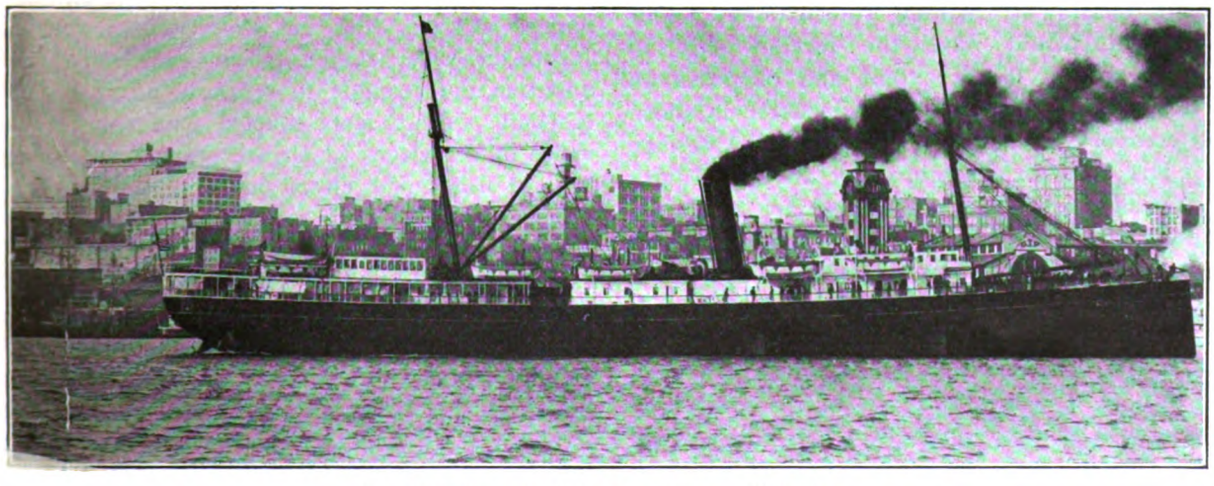
deal of friction between Chinese and Japanese shipping interests in Far Eastern waters. The Japanese interests are, it is true, overwhelmingly predominant, but of late successful efforts have been made to meet their competition along the coast of China. Now I hear a Chinese company is being formed, in conjunction with American capitalists, with a view to the maintenance of services on the Pacific. The intention at first is to establish a line to San Francisco. If this is successful vessels will be run on the European routes later on. At present the only Japanese company having a direct connection with the United Kingdom is the Nippon Yusen Kaisha, whose steamers make regular use of the Thames. I hear, however, that in consequence of the withdrawal of Austrian and German ships another Japanese concern, the Osaka Shosen Kaisha, intends to trade with Mediterranean and probably West of England ports. There is, in fact, abundant evidence to show that when the war comes to an end the German shipping industry will have new competitors to face.

Another Eagle Oil Tanker Launched.

The "San Patricio," the latest addition to the fleet of oil tank steamers of the Eagle Oil Transport Company, Ltd., was launched by Lady Denman on February 15th at Walker-on-Tyne. The "San Patricio" is the last of the nineteen vessels contracted for by the company as recently as 1912, and the completion of the order constitutes a record in the number and tonnage of vessels contracted for at one time. The "San Patricio," like her sister ships, has a deadweight capacity of over 15,000 tons, and thanks to Lord Cowdray's enterprise and foresight in anticipating the tendency of the times the Eagle Oil Transport Company can now claim to have the most efficient fleet of oil vessels in the world. It gives some idea of the magnitude of these vessels to state that their total carrying capacity is over a quarter of a million tons, and placed end to end they would measure over 1¾ miles.

The "San Patricio" was constructed by Sir W. G. Armstrong Whitworth and Co., and makes the sixth built for the Eagle Oil Transport Company by that firm. The vessel is 548 feet in length. She is built like the rest of the fleet to Lloyd's highest class on the Isherwood system of framing and is of the two-deck and shelter-deck type. The fuel oil is carried in a large cross bunker abaft the oil compartments proper, a deep tank at the forward end of the vessel, and in tanks at the sides of the main expansion trunk; so that the usual difficulty experienced in maintaining the trim of such vessels as the fuel is consumed is in this case practically done away with. Special arrangements are also provided for the use of what is known as low flash oil fuel, an elaborate system of isolation in the fuel-burning apparatus, and ventilation to all parts where inflammable gases are likely to collect, has been provided.

While the "San Patricio" completes the order given in 1912, it is the intention of the company to add to its fleet in the near future. It will be remembered that the company lost two of its tankers last year. The "San Wilfrido" was sunk by mines off Cuxhaven while in charge of a German pilot on the day previous to the declaration of war, while the directors sold to the French Government the "San Isidoro." At the launching function Colonel Saxon White, who directs the Walker yard, expressed the opinion that the limit of size in tankers has not been reached and predicted an immediate increase to 20,000 tons. At the recent meeting of the company Lord Cowdray said that the present fleet represents the last word in oil ship design and construction, but "I do not say by this," he continued, "that in any new ship we may build we cannot improve upon some of the details, nor possibly with advantage use Diesel engines as the motive power when extended use has proved them to be a success."



The "Northwestern" in the stream off Seattle.

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THE SEAMEN'S BILL.

The Seamen's Bill has now become an Act. Owing to the necessity of abrogating certain parts of foreign treaties most of the sections comprising the Act will not go into effect for some months, but, as far as American ships are concerned, the legislation becomes effective in its entirety on November 4th of the present year. As far as our coastwise shipping is concerned the Seamen's Act will not have much effect beyond certain increases in operating expenses. Such increases, of course, must be ultimately paid by the public. In short, this legislation in so far as it increases operating expenses, decreases the competitive value of water carriers versus rail carriers.

The trouble brewing features of the Seamen's Act consist of a set of regulations which are purely national in character, but which the Government insists on making international. Our Government would have the foreign ship in American waters to all extent and purposes an American ship. The foreign shipmaster is shorn of all control over his crew while in an American port. His crew is confronted by an opportunity to materially raise their wages and are easily led to desert the ship. Such a condition of affairs will invite reprisals. The American ship, or to say the least, the American registered ship, will disappear from the foreign trade routes. Another result of the American persecution of foreign shipping will be a heavy increase in the freighting business of Canadian seaports. The ships of all foreign nations with the exception of Japan will avoid American ports if they possibly can. This does not mean that our ports will be deserted by deep sea shipping, but it does mean that the Puget Sound country, for instance, will become a feeder to Victoria and Vancouver as far as foreign steamship lines are concerned.

At San Francisco the situation that will arise on November 4th next is a simple one. The seven steamers of the Pacific Mail Steamship Company, providing they are not sold in the meantime, will retire from the trans-Pacific route, leaving the situation as far as the Japanese and Chinese trade is concerned solely in the hands of the Japanese lines. A few months ago one of the oldest and most famous shipbuilding yards in the United States went under the hammer and now the oldest and most useful line of steamers flying the American flag is threatened with extinction.

Even the wildest stretch of the imagination can picture no advantage to the United States Government nor to the Sailors' Union by the removal of American trans-Pacific shipping.

THE WAR AND WAGES.

There is one result of the European war that is bound to have a marked effect in favor of the American ship regaining at least a tithe of her once proud place upon the sea, and that is the marked advance in the wages of the British sailor. It is generally conceded throughout Great Britain to-day that the cost of merchant shipping has increased approximately 20 per cent. since the outbreak of hostilities. Skilled labor is at a premium in the shipyards and this will mean heavy advances in the pay of the men. The stipend of those men who work in the British and Scotch shipyards will never recede to the same level as obtained before the war, and it is extremely doubtful if high class tonnage will ever again be produced much more cheaply abroad than it can be in the United States. At the present time a high class, well found freighter or tanker can be built as cheaply in the United States as in the yards of any of the nations at war, with the exception, of course, of Japan, the latter nation not being sufficiently compromised in the struggle to seriously affect her social economy. These facts coupled with the heavy advance in the wages of British seamen are bound to have a heartening effect on the champions of an American foreign trade merchant marine.

British seamen are fairly well organized, and it has been the history of trades-unionism that while it is easy enough to advance wages it is next to impossible to reduce them. The British sailor is now getting paid as well as our Atlantic Coast seaman, and if the war keeps up, his pay will go even higher. It is not at all unlikely that the pay of engineering and deck officers in the British mercantile marine will

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also be materially increased. In other words, the close of the present struggle will leave the cost of building and operating a vessel under the American flag much nearer an equality with the cost of operating an English built, English manned ship than it has been in the past. The moral of all this is that NOW is the time to build up American shipping.

TORPEDO NETS.

No detail of the defensive equipment of the modern battleship has aroused more discussion than the torpedo netting. There is no question of type or kind involved in the discussions on torpedo nettings, however, as it is a case of being either for or against the net entirely. Some countries have definitely abandoned the netting while still others are just taking the matter up seriously. The English navy has had its capital ships fitted with torpedo defense for many years, but lately there has been some temporizing, vessels being fitted with the sockets for the netting booms, while the installation of the equipment itself has been left to some future decision.

Our own naval experimental station at Newport has devised a net cutting device which is claimed to be extremely successful. This cutter will, it is claimed, operate perfectly, even when the torpedo strikes the netting at a fine angle. If this be true the exponents of the torpedo netting have lost one of their best arguments. A second netting located at some distance inside the first would make the defensive qualities of this mode of torpedo protection much more secure, but would add to the cumbrous litter of netting and booms. Whatever the fate of the torpedo netting, there will be a wonderful amount of energy expended in the effort to evolve some system of torpedo defenses as soon as the present European war has been brought to a close.

A JITNEY PROBLEM ON THE SEA.

Since the State Railroad Commission has been given jurisdiction over regular steamship lines operating between California ports, the "Jitney" problem has invaded the sea. The difficulty arises out of the fact that the Public Utilities Act gives the Railroad Commission control only over regular lines of vessels operating on regular schedules. The occasional tramp ship does not have to publish rates, can alter tariffs at a moment's notice, and generally speaking can do just about as she pleases in regard to the transportation of either passengers or freight. The injustice to the regular lines is obvious. So obvious, indeed, that the situation amounts to penalizing owners for maintaining regular services. Schedules mean expense in the steamship business. Freight is often left behind on the wharf on account of schedules, large numbers of agencies and ticket offices are occasioned by schedules, and vessels operating on regular routes should not be called upon to suffer encroachments on their business by non-regulated steamers or schooners.

"ABOUT" DEFINED.

A very interesting case has recently been decided by an arbitrator dealing with the meaning of the term "deadweight" in a certain charter-party. A steamer was chartered to a British firm and she was described in her charter-party as being of "about 2100 tons deadweight." After running the vessel for a short period, this firm re-let the steamer to another firm, again describing her as of "about 2100 tons deadweight."

The sub-charterer found that the capacity of the vessel had been overstated and claimed damages from the charterers, whereupon the latter, although they had not objected to the carrying capacity of the steamer before, and had described her to the sub-charterer in accordance with the owners' original description, then gave notice to the owners that they would hold them responsible for any damages for which they might be held liable. The matter was referred to arbitration, and the arbitrators disagreed.

An umpire was then appointed, and he decided that although the boat did not actually appear to have ever carried 2100 tons of cargo and bunkers, the short carrying was covered by the expression "about." It would seem that the 2100 tons included the stores and water in the boilers. In commenting on this case, "Fairplay" (London) remarks that in several cases on this point which have been before the courts the word "about" has been held to mean 3 per cent. either way. For instance, in the case of the Morris versus Levison, the ship was to load a full and complete cargo of "about 1,100 tons."

The charterer loaded 1080 tons, but the ship could have taken 1210 tons. It was held that effect must be given to the words "say, about 1100 tons," and that 3 per cent. was a fair excess to allow, so that the charterer ought to have loaded 1,133 tons. In another case, where the contract was to load a cargo of ore, "say, about 2800 tons," it was held sufficient to load 2840 tons, although the ship could have carried 2880 tons. In another case (Rotherfield SS. Co. versus Tweedy) the ship was to load under a berth-note a full cargo of wheat at a certain rate "per ton on the guaranteed deadweight capacity of 4250 tons." The 4250 tons included bunker coals, and the vessel only took on board 3947 tons of cargo. It was held that freight was payable upon 3947 tons only, not upon 4250 tons.

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The Port of Vancouver

By CONSUL GENERAL R. E. MANSFIELD.

ONE of the principal features, and an important asset of Vancouver, as the transportation, commercial and industrial center of British Columbia, is the splendid harbor on which it is situated. Nature is the important factor in the creation of great harbors, and from this point of view Vancover has been wonderfully favored.

Burrard Inlet, the harbor proper, extends for a distance of twelve miles from the Narrows, as the entrance is called, eastward to Port Moody at the head of the inlet, which was first selected for the location for the terminal wharves and docks of the Canadian Pacific Railway, the first of the transcontinental lines to reach the British Columbia coast in 1886. Later when the Canadian Pacific Railway extended its lines further west and decided to construct its terminals on the south shore of Burrard Inlet, on the site where Vancouver stands now, the foundations were laid for the greatest sea port and shipping center in the Canadian Northwest. The Inlet, 12 miles in length and two miles wide on the average, forms an area of about twenty-four square miles. Extending northwesterly from a point about seven miles from the entrance up the north shore is what is known as the North Arm, an extension longer than the main Inlet, and averaging two miles in width.

The favorable features of Vancouver harbor are, an all the year round open port, ample anchorage, many miles of water front with depth sufficient for the largest vessels, perfect security from the weather conditions, accessibility to the open sea and to the coast waters of British Columbia. The waters of the harbor are of great depth in mid channel, more than thirty fathoms in places, while near the shore there is a depth of water in most places of more than twenty-five feet. In some instances deep water extends so close in that large vessels can anchor within a few rods of the shore.

Extension of Wharfage.

The shipping facilities of Vancouver harbor have so far been confined generally to the south shore of the Inlet, where much of the water front is covered with sawmills and other industries. But the growth of the shipping interest will soon require practically all the south shore, and is already extending to the north shore, where large docks, wharfs and shipbuilding plants are being constructed. Within a few years the factories situated along the inlet within the corporation limits will give way to wharfage and docks, as the sites are becoming too valuable for use for manufacturing purposes.

Extensive improvements are being made to accommodate the increasing business of the port, for which a sum aggregating several million dollars will be spent this year, and when the new government and private docks, wharfs, dredging schemes planned and in the course of constructon are completed, the facilities of the harbor will be greatly increased, making the Vancouver harbor one of the best on the Pacific coast.

Mosquito Fleet Harbor.

In addition to the deep water harbor of Burrard Inlet the needs of smaller craft have also been provided for in the shallow waters of False Creek, a small inlet running just south of, and parallel with

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The Canadian Pacific Railway Wharves at Vancouver.



Vancouver's busy water front.

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the main body of water. False Creek, the shores of which are mostly tide flats, is the rendezvous and furnishes a harbor for Vancouver's "mosquito fleet," where there is usually a congestion of small craft traffic, especially of tug boats, scows and launches. It is also used as a storage basin for log booms for the various sawmills that line its shores.

Shipping and Railway Companies.

Five transcontinental railways, the Canadian Pacific, Grand Trunk Pacific and Canadian Northern Pacific, all Canadian lines, the Great Northern and the Chicago, Milwaukee and St. Paul, American lines, have their terminals in Vancouver, in addition to which the following steamship companies have headquarters and agencies in this port:

The Canadian Pacific Railway Company operates a line of fast mail steamers between Vancouver and China and Japan; also a line between Montreal and Liverpool and from Liverpool to Hong Kong and Yokohama, in connection with the fast trains on the Canadian Pacific Railway, making a round the world circuit of transportation under the management of one company. This company also operates a line of coast steamers, carrying passengers and cargo from Vancouver to various British Columbia, Alaskan and Puget Sound ports.

The Canadian-Australian Royal Mail Steamship line operates a monthly service from Vancouver to Hawaii, New Zealand, Fiji Island and Australian ports.

The Ocean Steamship Company, Limited, and the China Steamship Company, Limited, the "Blue Funnel Line," from London, Glasgow and Liverpool to Vancouver (will use the Panama Canal route when that waterway is opened).

Harrison Direct line, from Glasgow, Antwerp, London, and Liverpool to Vancouver.

Pacific Coast Steamship Company, Vancouver to San Francisco.

Grand Trunk Pacific Steamship Company, weekly service to Prince Rupert, Granby Bay, B. C., Stewart, Alaska and Victoria and Seattle.

Union Steamship Company from Vancouver to other British Columbia ports.

Terminal Steamship Company, Limited, British Columbia coast service.

Northern Steamship Company, British Columbia coast and Alaskan service.

Hamburg-American line from Hamburg and Antwerp to Vancouver via the Orient.

East Asiatic line, Hamburg, Rotterdam and Antwerp, via Magellan Straits to Vancouver. This line, and others with headquarters in Europe, will use the Panama Canal route when the canal is opened.

Royal Mail Steam Packet Company, operating a service between Great Britain and the Pacific coast, via the Orient.

Included in the port business is several ferries which operate a regular service between Vancouver and the suburban municipalities situated on the inlet.

In addition to the regular service of the above named companies, many tramp steamers and sailing vessels visit this port monthly which, added to the number of fishing boats, tugs, barges, etc., used in handling the traffic of the port, present always a scene of great activity in the Vancouver harbor.

Harbor Environments.

An interesting feature of the harbor of Vancouver is the beauty of its environment. The city is built upon a peninsula formed by the waters of Burrard Inlet and the Fraser River, the extreme point of which is Stanely Park, comprising 1,000 acres of natural forest, one of the finest parks on the continent. Ships entering the harbor pass around the park, back of which rises the city on hills and elevations overlooking the bay. Opposite the city, across the inlet, in the near distance, rises the Coast Range of mountains, forest covered, the higher peaks of which are snow crowned, forming a beautiful and picturesque background to the harbor where are always anchored vessels flying the flags of many nations.

The table given herewith is of peculiar interest to the American public at the present time. It shows that despite the war and the almost entire disappearance of the German merchant fleets engaged in our foreign commerce carrying, and also despite what the lay press of the country has been pleased to term "The phenomenal growth of our foreign trade merchant marine accomplished through American-owned foreign-built vessels taking out United States registry," that our participation in our own carrying trade has only increased from 9.26 to 14.09 per cent. of the total. This is surely not much to brag over, but nevertheless it shows progress in the right direction and the following six months should show a greater gain than the past half year:

Flag under which carried	Value of water-borne commerce		Percentage.	
	Fiscal year 1914	July-December, 1914	1913-14	July-December 1914
American	$ 368,360,000	$ 234,009,000	9.26	14.09
British	2,023,340,000	872,581,000	53.45	52.54
German	522,137,000	50,803,000	13.79	3.06
French	175,501,000	76,988,000	4.64	4.64
Dutch	155,064,000	97,985,000	4.10	5.90
Norwegian	132,028,000	100,209,000	3.49	6.03
Japanese	80,963,000	44,053,000	2.14	2.65
Italian	73,442,000	51,505,000	1.94	3.10
Austrian	59,445,000	3,873,000	1.57	.23
Belgian	47,966,000	7,791,000	1.27	.47
All other	147,223,000	120,964,000	4.35	7.29
Total	$3,785,469,000	$1,660,761,000	100.00	100.00

The British schooner "David Evans," which has been lying at Astoria for several months, has been taken by Balfour, Guthrie & Company to load lumber for Japan. Captain Edward Spicer will go in her as master. Captain Spicer was formerly in the "Cecilia Sutton," which vessel was sold last fall in Tasmania.

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Freight Report

By PAGE BROTHERS.

San Francisco, March 22, 1915.

Our last review was dated 19th of February and though the records of freight rates were high then, they have touched an even higher notch since. Steamer "Epsom" was chartered for wheat from Portland to U. K. by Kerr, Gifford & Co. at 70/-, a rate which we can hardly expect to see eclipsed. No more steamers were chartered for wheat from the north up to date, simply because none were obtainable. Messrs. Strauss & Co. chartered the sailing ship "Kilmallie" at 57/6, Queenstown for orders to U. K., which is also a record for sailing vessels from the North. They have the privilege of loading her at San Francisco at 50/-, and at the same time, they chartered the "MacMahon" at 47/6 for spot loading at San Francisco.

A new feature in the market has been the chartering for new crop loading by Balfour, Guthrie & Co., of the "Bougainville" and the "Mezly" to load at San Francisco, wheat and/or barley, and with the option of sending them from this port to load at Portland by paying the ships 57/6 and 60/- respectively. For as conservative a house as Balfour, Guthrie & Co. to charter for new crop, as early in the season as the present, seems to indicate that they have faith in the future freight market. This same firm chartered the Norwegian bark "Hiawatha" to load wheat from Portland to Sydney or Melbourne at 50/-, the highest rate paid for Australia in our recollection.

A strong demand for our coasting schooners for lumber to Australia and elsewhere has developed, charterers apparently having realized that on account of the absence of steamers, they had better get into the market for the only available tonnage left, resulting in the American Trading Co. chartering the "Echo" at 55/- Sydney, the "Inca" at 55/- Sydney and/or Newcastle and 62/6 Melbourne or Adelaide, and "Winslow" from Eureka to Sydney on private terms. Hind, Rolph & Co. chartered "Luzon" at 52/6 Sydney, and "Sehome" at the same price, same port, the "C. F. Crocker" at 55/- Sydney, and "Camano" at 60/- Sydney, also "Lottie Bennett" from Eureka to Sydney on private terms. The Charles Nelson Co. chartered "George E. Billings" 55/- Sydney, 65/- Melbourne or Adelaide. J. J. Moore & Co. did their share by taking "Alta" from San Francisco to Melbourne on a lump sum basis, and the "Georgina" from Puget Sound to Melbourne or Adelaide on private terms. They paid "William H. Talbot" 57/6 for Sydney. Davies & Fehon chartered "Mabel Gale" at 60/-, same destination, and Comyn, Mackall & Co. paid 72/6 for "Alpena" to Adelaide. Grace & Co. took in "Forest Home" with lumber from the North to Callao at 52/6 followed by Comyn, Mackall & Co. chartering "Eric" at the same price to a direct port on the West Coast, and in addition, the "William Bowden" and "Okanogan" at 55/-.

No charters whatever have been made to the Orient. Schooner "Encore" has the distinction of having about the highest record per thousand feet for lumber from this coast to Cape Town, having just been chartered by Balfour, Guthrie & Co. at 100/-. Grace's steamer "Cacique" obtained $7.50 for coal from Norfolk, Va., to San Francisco, and bids have just been opened in which vessels now ask $8.00 with every likelihood that the Government will pay this price. Charles R. McCormick & Co. have chartered steam schooners "St. Helens" and "Alvarado" on Time Charter, terms of which are private, to carry lumber to New York and vicinity. Messrs. Sudden & Christenson will send their sailing vessels "John Palmer" and "John C. Meyer" also with lumber from the Columbia River to Quebec, and the firm of Bloedel & Donovan Lumber Co. have chartered "Archer," a very small vessel with auxiliary power, to load lumber from Bellingham to New York.

In foreign Time Charters, cables report steamer "Lord Derby," delivery and redelivery Newcastle, Australia, fixed by Andrew Weir & Co. at 8/- on the dead-weight for twenty months, and steamer "Echunga" chartered for the same delivery and redelivery, for one year at 9/- by some firm not yet named, who have re-let her since at 11/- on the dead-weight. Strong demand exists both for our coasting and for foreign tonnage to the U. K., the owners of which are now holding for higher rates.

Captain J. P. Breckwoldt of Hamburg was in Portland for several days during the latter part of February and the first of March. Captain Breckwoldt represents the well-known underwriting firm of H. F. M. Mutzenbecher, Hamburg; he has been looking over dry dock and repairing facilities on the Pacific Coast and expressed himself as well pleased with conditions as found at the Port of Portland dry dock and at the plant of the Willamette Iron & Steel Works, where he was much impressed by the work done on the Atlantic & Pacific steamship "Santa Catalina."

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FIREMAN'S FUND
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HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Local Marine Insurance in 1914

THE following review of the marine insurance situation on the Pacific Coast for 1914 was prepared by one of our friends among the underwriters, who does not attempt to gloss over the fact that 1914 was a poor year for the writers of marine insurance:

The operations of the marine insurance companies on the Pacific Coast for the year 1914 on the whole did not net the companies or the general agents, for they are nearly all on a small commission and large contingent basis, anywhere near what the same amount of time and grey matter would have netted in practically any other line of insurance or other business. Probably on the whole the operations of the companies show a balance on the wrong side of the ledger, and there is a great deal of sympathy coming to any man upon whom devolves the underwriting for a marine company; for, to say the least, it is a nerve-racking business, even aside from the war risk end of it.

For instance, the sailing vessel on the Pacific Coast is still a large part of the business—lumber cargoes between Pacific Coast and Australia or West Coast of South America. We insure a cargo, say on the barkentine "Americana" from Puget Sound to Sydney. The usual trip is from sixty to seventy-five days. About the seventy-sixth day the underwriter begins to worry about the non-arrival of the vessel in port, and this pleasure—if he happens to have a considerable line in the cargo—continues until the vessel finally arrives, which may be in a hundred or a hundred and twenty days, or until the vessel is posted as "Missing," which would be in about two hundred days. This is a pleasure unknown to the fire or accident underwriter. He usually knows the worst when he picks up the morning paper or receives his telegram advising of the loss.

Another of the joys of the marine underwriter is to have a vessel that he insures, such as the "Camino," lose her propeller and wire for assistance, and be picked up by another steamer and towed to port. In this case there was a saved value of about, say $400,000. The salving steamer lost one day's time in towing this vessel to port. We who sit at the underwriting desk think that the salver would have been very handsomely repaid if she was awarded, say $4,000 for one day's work, the actual cost of which did not exceed $400. Consequently, we are appalled when there is a claim made against us of $75,000, with a chance of getting it if the court sees fit to award it.

January, 1914, opened up with a series of gales that drove all of our coastwise vessels into port with, in most cases, the loss of their deckloads, which is one of the most serious drains on income that underwriters have to bear. This one storm caused seven sailers from Puget Sound to return with losses to the underwriters of about $100,000. Also about a dozen of the local type of steam-schooners were driven to cover at a further cost of about the same amount.

In March the new steel steam-schooner "Cricket" burned at the dock at Portland, costing the companies over $100,000.

In August the S. S. "Admiral Sampson" was sunk by the steamer "Princess Victoria," costing the companies over $300,000.

In September the steel steam-schooner "Francis H. Leggett" foundered and took $250,000 from the companies.

In October the steamer "Santa Catalina" burned at Portland at a cost of about $400,000.

In November the S. S. "Dirigo" foundered and was insured on a valuation of $90,000.

In December the S. S. "Eureka" was lost, $50,000; the "Coos Bay," $35,000; the "Hanalei," $60,000; the S. S. "Isthmian" stranded and her repairs and damaged cargo set the underwriters back about $300,000, and as a fitting climax to the year in the last week the fine new motor ship "Malakka" stranded and became a total loss, with cargo insured in this market valued at about $300,000. The loss of the vessel herself, however, about $500,000, will fall upon foreign underwriters. When you consider that the total amount of marine insurance premiums on the Coast

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INSURANCE COMPANY

FREIGHTS AND DISBURSEMENTS

STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
220 BYRNE BUILDING
LOS ANGELES, CALIFORNIA

F. HERRMANN & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK

AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

does not exceed $250,000, you will see that with the innumerable small claims always in evidence there is not much left in this year's business for the companies.

Following is a partial list of some of the heaviest partial loss and particular average claims not among the above:

Over $20,000	Value
Schr. "F. M. Slade"	$ 60,000
S. S. "Nome City"	25,000
Schr. "Wm. F. Garms"	25,000
Tug "Milwaukee"	20,000
S. S. "Petaluma"	25,000
S. S. "Fair Oaks"	15,000
Bk. "Paramita"	30,000
Schr. "Nokomis"	40,000
S. S. "Cricket"	25,000
Bge. "America"	40,000
Schr. "Polaris"	25,000
S. S. "Pectan"	70,000
S. S. "Rochelle"	60,000
S. S. "Edgar H. Vance"	40,000
S. S. "Prince Albert"	35,000
Schr. "S. T. Alexander"	30,000
S. S. "Mina Brea"	250,000
Dredge "Coronado"	25,000
S. S. "Gamecock"	25,000
Bk. "Asneries"	60,000
Bge. "Girad C. Tobey"	20,000
S. S. "Azov"	60,000
S. S. "Hixomia"	20,000
S. S. "Glenroy"	25,000
Tug "Lorne"	30,000
Bge. "Frederick"	30,000
S. S. "Lurline"	20,000
S. S. "Wilhelmina"	20,000
So. "Arctic Stream"	25,000
S. S. "Mariposa"	20,000
S. S. "General Hubbard"	25,000
S. S. "Vadso"	30,000
Schr. "Pathfinder"	20,000
S. S. "Jeanie"	30,000
Bk. "Battle Abbey"	40,000
S. S. "Cowrie"	40,000
S. S. "Pomo"	35,000

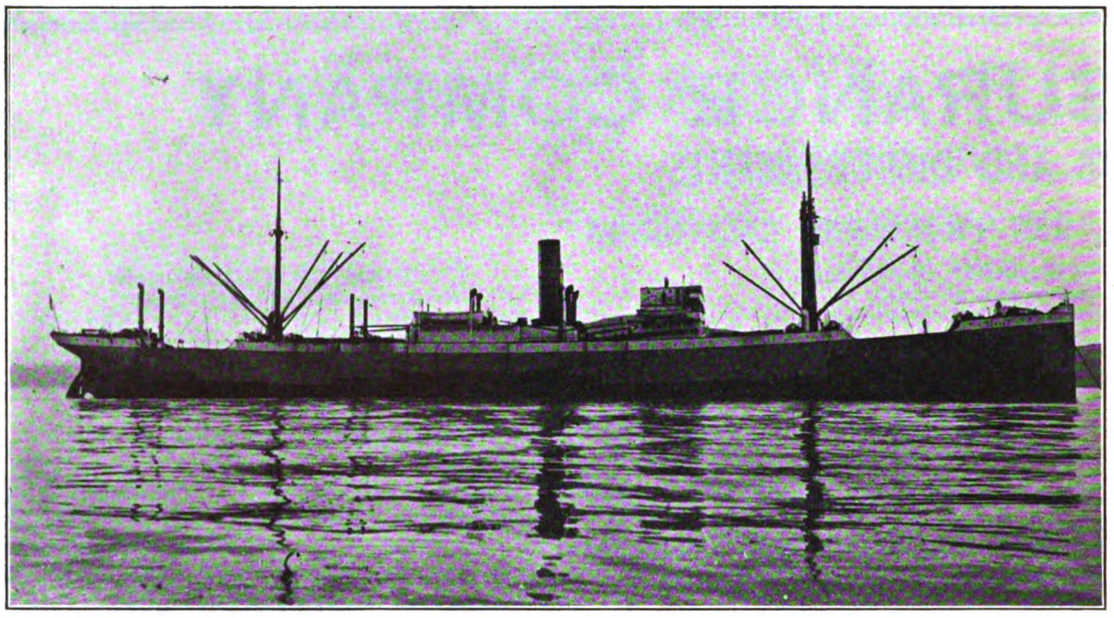
The amount of war risk premiums written by the Pacific Coast agencies is very hard to estimate, although they could hardly exceed $100,000. Fortunately for the local companies, they have not, so far, been called upon to pay any losses under this caption, as the three Pacific Ocean war risk losses, the S. S. "Elsinor" (about $400,000), the "Bankfield" (about $500,000), and the S. S. "Charcos" (about $400,000), were all insured elsewhere.

The completion of the Panama-Pacific Exposition, which took enormous quantities of lumber, has completely demoralized local coastwise freight conditions, as this has kept quite a fleet of vessels busy trading, which are now laid up. The completion of the Panama Canal has had a varied effect on our business, but the rates have been cut pretty nearly in two—the Canal rate as against the Magellan rate—so there is hardly any increase of income from this source. In fact there has been quite a loss in freight to Pacific Coast steamers as now considerable quantities of cargo that used to go via San Francisco are shipped direct from Atlantic United States to Asiatic ports.

The war, of course, has had a very demolizing effect upon marine insurance premium income. The Kosmos line of steamers, as also the Hamburg-American line, to say nothing of the German tramps, were looked upon by us as quite a considerable source of income, has now been completely shut off. Also the war has had a very demoralizing effect upon the South American lumber trade—one of the largest individual classes of income—as this business has practically been at a standstill as the financing of that business was all formerly done through the German banks.

The dried fruit business has also suffered severely through the war as Germany usually took the bulk of the California dried fruit, which is now a drug on the market; with the elimination of the competition of the German companies, and the German insurance market, certain large centers may have been able to get greatly increased rates but in this market when the vessels are smaller and the concentrated values less, as there is usually ample local carrying capacity for all of the risks offered, there has hardly been any

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The S. S. "Kentra," recently damaged by fire in her cotton cargo at Genoa.

perceptible increase in rates owing to a too keen local competition, greatly to be regretted.

The lumber business on this coast, which is probably the largest single source of income to the companies, has been in a very demoralized condition during 1914, and our income from this source has consequently suffered, as a great number of the larger mills have been closed down completely.

Taking it all in all, there is hardly a marine insurance underwriter on the Pacific Coast who was not thankful when December 31st arrived, and he could close his books and start the new year with a clean sheet, although the total loss of the fine new American-Hawaiian sugar steamer "Washingtonian," right after the turn of the year, brought sadness to many with its two million dollar insurance loss.

MARINE MISHAPS.

"AL-KI." The Border Line Transportation Company's southeastern Alaska route steamer "Al-ki" on her regular voyage from Seattle to Alaska, cracked her high pressure cylinder on February 27th, and was forced to return to Seattle for engine repairs.

"KENTRA." The steamer "Kentra," formerly of the Maple Leaf Line and well known on the Pacific Coast, was seriously damaged by fire in the harbor of Genoa on February 15th. The "Kentra" was loaded with cotton and was en route from Savannah to Swansea.

"W. F. JEWETT." This schooner arrived at San Pedro on March 5th minus a goodly portion of her headgear and considerable canvas. Cause, heavy weather.

"RELIANCE." The tug "Reliance" went aground on Anita rock off the Presidio on March 10th, but was later floated with little damage.

"WASHINGTON." The steamer "Washington" caught fire on March 10th at the wharf of the Little River Lumber Company. The fire was extinguished late in the evening but the vessel suffered considerable damage.

The various legs of the New York-San Francisco motor boat race are as follows:

From the Atlantic Yacht Club, New York to Charleston, South Carolina, 627 miles; from Charleston to Key West, Florida, 588 miles; Key West to Cristobal, Panama, 1070 miles; Cristobal to Balboa (this stretch through the canal is not figured in the racing length of the course and is omitted from the time allowance calculations); Balboa to Corinto, Nicaragua, 683 miles; Corinto to Salina Cruz, Mexico, 525 miles; Salina Cruz to Mazatlan, Mexico, 877 miles; Mazatlan to San Pedro, 1002 miles, and San Pedro to San Francisco, 358 miles, a total distance of 5730 miles. The western committee which is in charge of the west coast stopping places and the finish of the race is composed of Messrs. I. H. Cory, F. M. Garden, H. L. Burleson and F. M. Rittigstein, and the eastern committee which will supervise the Atlantic and Gulf end of the course is composed of Messrs. F. F. Chapman, E. C. Headley, Dr. J. W. Hughes, R. B. Clark and Thomas D. Bowes. The race is one in which the sturdiness and sea-going qualities of the boats and the ability of their navigators will figure more than speed.

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THE GOVERNMENT AND FREIGHTS.

"Ocean freight rates have been arbitrarily increased to an unparalleled height without regard to the interests of American trade.

"Some business plants have been shut down as a result of the exorbitant rates.

"If common carriers on land were to practice such discriminations against shippers, and such arbitrary methods, they would be subject to criminal prosecution."

"These counts are contained in a bitter indictment against the foreign ship owners, filed with the Senate by Secretary of the Treasury McAdoo and Secretary of Commerce Redfield, who assert that the facts as they have found them are an unanswerable argument in favor of an American Government merchant marine. The Secretaries declare that increases in the cotton rate of 1100 per cent. on shipments to Bremen and of 900 per cent. on grain show, in part, the extortionate methods of the steamship owners in dealing with American exporters since the beginning of the European war.

Some of the striking increases, which were reported to the Departments by American business men and shippers are:

From New York to Rotterdam—On grain, 900 per cent.; on flour, 500 per cent; on cotton, 700 per cent.

From New York to Liverpool the rates on the same commodities have increased from 300 to 500 per cent.

From Baltimore to European ports (except German)—On grain, 900 per cent.; on flour, 364 per cent.; on cotton, 614 per cent.

From Norfolk to Liverpool—Grain, from 127 to 200 per cent.; cotton, 186 per cent.

From Norfolk to Rotterdam, cotton, 471 per cent.; to Bremen, on cotton, 1110 per cent., or from $1.25 per bale to $15 per bale.

From Galveston to Liverpool, grain, 174 per cent.; cotton, 361 per cent. To Bremen, cotton, 1061 to 1151 per cent.

The report finds that these ocean freight charges "arbitrarily imposed upon our farmers and business men," meant an increase for December alone of $18,018,700, and if the exports continue at this rate it is estimated that the shipowners, principally foreign, will collect for the year 1915, increased freight charges above the normal rates of $216,224,400.

"High rates are not only restricting the general volume of our export trade," says the report, "but are actually stopping exportations in some lines. Ship owners in some instances are taking only those goods or commodities which will pay the highest rates of freight and are easily unloaded, and are declining to accept shipments of other commodities (such, for instance, as lumber), because the character of the shipments and rates obtainable thereon make it more to the interest of the steamship owner to accept one class of goods than another. These discriminations against different classes of American produce and against certain lines of American business are both arbitrary and hurtful."

The report here calls attention to a letter received January 15, 1915, from the Panama Railroad Company, showing the inability to get coal to the Canal Zone for the use of the Panama Canal, and adds:

"The direct charge is that the Holland-America Line has repudiated written calls with American shippers and has increased freight charges without regard to their rights."

A big commission house in San Francisco wrote that 600 tons of dried fruit shipped through the Panama Canal to New York, for export to Holland and Scandinavian ports, were held up a long time in New York because no ships were available. The rates on this product increased 300 per cent. following the war, up to the first of the year, and 100 per cent. has been added since then.

A New York manufacturer of Portland cement reported that before the war, shipments of this commodity were possible to Argentine and Uruguay at $2.45 per ton, and to Brazil at $3.60 a ton. Early in August these rates were boosted 50 per cent., and further raised since September, until now they are $6 per ton to Rio Janeiro by some lines, and $8.50 a ton by others; and $6 to Argentine."

In this connection it is a remarkable thing how utterly misleading the truth can be sometimes. It must be borne in mind that the two worthy members of the Cabinet are making out a case for a favored bit of legislation. They have presented their case in its most favorable aspect from their own point of view. Isolated cases are generally treated as exceptions, which prove the rule and not as the rule itself. As a matter of fact, the doubling of freight rates from what they were before the war would not constitute extortion. Crews' wages have advanced materially, war insurance is an item not to be sniffed at, and the overcrowding of ports with the consequential increase in the number of "lay days" has decreased the earning days by fully 25 per cent. These, with other causes, in view of the former depressed conditions of the freight market, would make 100 per cent. increases appear not to be inordinate.

The Secretary of Commerce and the Secretary of the Treasury sniff at such modest increases as 100 per cent., however, and soar dizzily into 1000 and 1100 per cent. raises with the ease and sang froid of mining stock operators. Undoubtedly the report of the two Cabinet officers is correct as far as it goes and freights are generally high and in some cases exorbitant, but even so, how would $30,000,000 worth of Government-owned ships alter the situation? The exorbitant rates are either the result of the peculiar risk incident to certain cases or else the remarkable scarcity of available tonnage.

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With Those Who Do Things

Supreme among the oil-engines exhibited in the Palace of Machinery at the Panama-Pacific Exposition is the 525 B. H. P. Diesel type set now on the space occupied by the McIntosh & Seymour Corporation, of Auburn, N. Y. This engine is not only the largest and most powerful of its class in the whole Exposition, but it represents also the acme of efficiency, economy, simplicity and human perfection in workmanship. By observing how quietly and smoothly this engine operates, the visitor will gain an appreciation of its superiority.

Fittingly the honors in the oil-engine section pass into the hands of such a thoroughly American and long-established company as the McIntosh & Seymour Corporation, which has gained world-wide renown in the domain of steam-engines. This is one of the few American engineering firms that has competed successfully with the European manufacturers not only in South America, Australasia, Africa and the Far East, but also in their own continent, and its products have earned the praise of many foreign leaders of engine design and construction.

The McIntosh & Seymour Corporation has a longer association with World's Fairs than any of its competitors in the oil-engine business. Its exhibit 22 years ago at the Columbian Exposition at Chicago, for instance, was one of the leading engine displays of that now classic event. During the course of its history this firm has built machinery aggregating more than one and a half million horse-power. It has constructed some of the biggest engines in the world, the size having been limited only by the restrictions of shipment and transport. Three mammoth engines of 5000 kw. capacity each, built by the Auburn firm, are installed in the Redondo Central Station of the Pacific Light & Power Company, and other powerful sets from the same works can be seen in notable power plants all over the United States.

By contrast with the giant engines built in former years, the single-cylinder horizontal 100 kw. steam unit representing the McIntosh & Seymour Corporation in the Palace of Machinery at this Fair is a dwarf in size. Its economy and efficiency, however, render it noteworthy. Two reasons have been responsible for the selection of such a relatively small unit to typify and illustrate this firm's steam-engine construction. In the first place, fashions have changed, and the mammoth reciprocating steam-engine is no longer demanded. Secondly, the scope for the steam-engine in California is destined to become less now that the Diesel type engine, which burns the fuel oil directly, can supplant it with greater satisfaction and to better advantage. The small steam unit shown in operation responds to the most exacting demand of the discriminating steam-engineer, who can appreciate that reliable service is the foremost and greatest quality of machinery.

Of the two Diesel-type engines which are being installed by the McIntosh & Seymour Corporation, the larger set, of 525 H. P. capacity, will be shown in operation, using the fuel oil supplied at the header in the Machinery Palace. At the price of 92 cents per barrel of 42 gallons, this fuel will give about 850 brake-horse-power-hours, or, say, 525 kilowatt-hours, at a cost of one dollar, the consumption of the engine being remarkably low.

With four cylinders and operating on the four-stroke cycle, this engine develops the power at 165 revolutions per minute. It is of a design and construction that has been perfected by 17 years' association with the problem of Diesel work, the McIntosh & Seymour Corporation deriving this advantage from co-operation with the first and earliest Diesel engine factory built in Europe. This fine engine conforms to the very latest practice of the European engineers, whose experience and knowledge of Diesel engine construction are unrivaled, this type having been freely developed there by firms of great and untarnished repute.

The smaller Diesel-type engine on the space occupied by the McIntosh & Seymour Corporation is a four-cylinder set of 280 B. H. P. capacity, designed to turn at 200 revolutions per minute. In character it is distinguished from the larger set chiefly by its box-frame and by the greater compactness due to the higher running speed.

Both these engines are remarkable for the extraordinarily high grade of workmanship in all the finished parts, a tolerance of only half one-thousandth of an inch being permitted in the manufacture. They are representative of the most worthy achievements of American engineers and set the high standard for all future Diesel engine work in this country.

SOMETHING NEW IN ALCOHOLIC EQUIPMENT.

On board small yachts but little space is available for any of the "comforts of home," and kerosene or gasoline stoves of small sizes had been used until alcohol stoves were introduced. These had great advantages over the former, in being clean and odorless, but presented some difficulties with regard to repairs, leaks, etc., due to mechanical construction. It was impossible to clean the burners except from the back, and the wicks

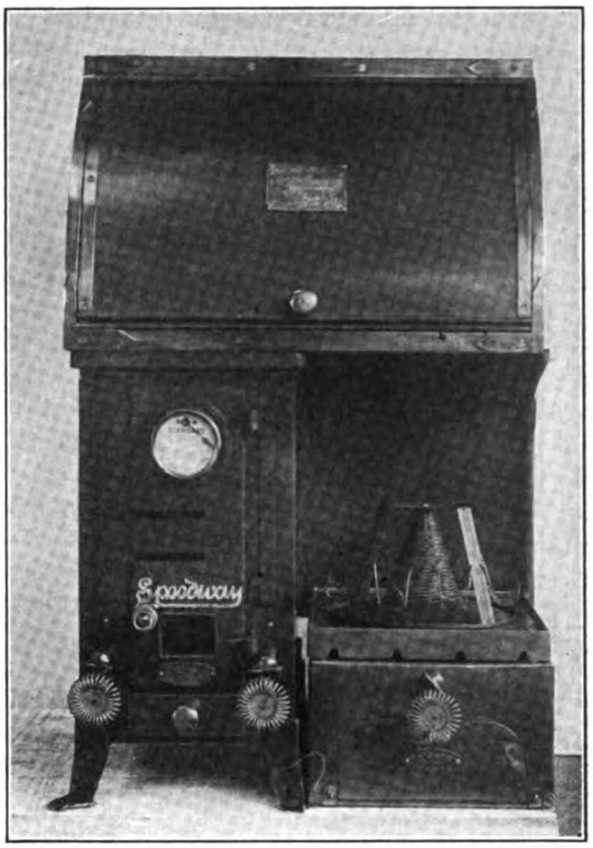
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would stick and could not be removed. Leaks caused fires, and it was impossible to broil steaks. The best broiler available was but a hot iron plate over an alcohol burner, and when the steak was placed thereon, the fat sizzled and burned, filling the car or boat with smoke and odors to the discomfort of guests or passengers.

The Gas Engine & Power Co., and Charles L. Seabury & Co., Consolidated, of Morris Heights, New York City, who have produced the present boon for the culinary experts, decided to solve the problem, and experimented for three years, until now an ideal, safe and economic outfit is the result. The improvements are many and complete, and are thoroughly covered in patent claims.

In the first place, an alcohol burner has been produced in two types, a single and a double burner. In each the so-called "wick" is made of such construction as to completely gasify the liquid alcohol before it reaches the burner tips, thereby getting greater calorific efficiency than with the use of the old wicks, which permitted liquid fuel to get by the burner tip. Again, all burners of the "Speedway," as these improved outfits are designated, type are so constructed that they can be cleaned from the front of the stove, and a wick removed for cleaning and a fresh one inserted in half a minute by the cook, instead of requiring a plumber to dismantle the outfit, as in the older types. Leaks frequently occurred through the valve stem openings. In the "Speedway" burners a packing-nut with lock-nut effectively prevents any tendency in that direction. A flash-pan is so designed that should a valve be left open through carelessness, the fuel will not run over, gasify in the compartment, or catch fire and spread as formerly. Instead it will pass through an overflow pipe and drain into an auxiliary tank placed conveniently below the stove shelf. In this way not only is the overflow alcohol prevented from doing damage, but it is actually saved and poured back into the fuel-tank to be used. Repeated tests have proven this safety precaution to have been satisfactorily solved.

The broiler is indeed a most ingenious, yet simple device, the fruit of untiring experimentation over a long period. It is a vertical box-like device in which are installed two "Speedway" special design burners, one on each side near the bottom. Over these burners are suspended baffle-plates, such that the heat is uniformly distributed from bottom to top of the broiler. A thermometer is fitted to the door. On the bottom, between the two burners, is a drain-trough on which the broiling-iron is placed with the steak in position, which is vertical, the fattest part of the steak being placed on top. A temperature of 300 to 350 degrees on the thermometer assures a good, quick broiling temperature of 450 to 500 degrees inside. The fat, melting, drips down over the surface of the meat, thus basting it. At the bottom it passes



A new alcohol stove.

from the trough to a grease-drawer beneath from which it is recovered.

The buffet equipment here shown consists of broiler A, one burner, stove B, toaster C, hot-plate D, on which griddle cakes can be made, and plate-warmer E. This entire outfit occupies a space of 17 x 17 inches, and in conjunction with it is used a combination boiler for coffee, hot water, etc., five compartments being provided, the total space required being but 18 x 27 inches.

The distinctive features of the concentrated filament Mazda lamps of high wattages have proved so popular that the Edison Lamp Works of the General Electric Company has developed vacuum Mazda lamps of similar appearance in the 25, 40 and 60 watt sizes. This concentrated filament construction gives greater vertical distribution of light than the regular Mazda lamps of corresponding wattages. The new lamps will, therefore, be employed where natural distribution of light downward is required. They can be used in existing sockets and fixtures.

These lamps will be made in the same sized bulbs as the corresponding regular Mazda lamps, will have the same spherical watts per candlepower efficiency and will have a rated average life of 600 hours.

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SOME RECENT EASTERN PLEASURE CRAFT.

Around San Francisco Bay the Exposition with its extensive program of water events has aroused a hearty interest in small craft of all kinds and in this connection it will perhaps prove of interest to our readers to glance over the following review of the output of some of the eastern small boat and engine builders.

A typical boat is the 55′ auxiliary schooner "Lismore" for a member of the Seawanhaka Yacht Club, now building by Wm. Wallin Ship Building Co. of Brooklyn, N. Y. This boat is equipped with a 24 horse-power Holmes motor. The 50′ sloop rigged auxiliary "Jose Antonio" designed for Messrs. Villamil & Gil, of San Juan, Porto Rico, building by the Smith & Williams Yard, Salisbury, Md. This boat is equipped with a 24-26 horse-power Lamb motor. This yard is also building from Mr. Watts' designs, two 19′ boats, one sail and the other power, for the same owners, and also a 55′ auxiliary as yet unnamed, for a Philadelphia yachtsman.

The 52′ mahogany finished inspection boat for the officers of the Campeche-Laguna Corp. is building by the Essington Ship Building Co., Ltd., for use in Campeche, Mexico. This boat is equipped with a 40 horse-power heavy duty Sterling motor. The yards of L. D. Steel at Delanco, N. J., are building four boats, one the 45′ "Naiad" for Mr. E. C. Johnson, with a 6 cylinder, 60 horse-power Van Blerck motor; a 28′ mahogany finished runabout for Mr. E. B. Jackson with a 6 cylinder Packard motor; a 45′ cruiser for Mrs. F. Woodward Earl, of Edgewater Park, N. J., with a 6 cylinder, 70 horse-power Frisbie motor, and a racing motor boat of the wave collecting type, for a New Jersey yachtsman.

Troth, of Camden, is building a tug for the Rickards Dredging Co., 38′ long, with a 50 horse-power Harris motor. A 48′ cruiser for Mr. R. H. Stackhouse, of Philadelphia, with a 37 horse-power Standard motor, is now being designed. The 62′ cruiser "Tillie A" building for Anton Ahlers, of the Wissinoming Yacht Club, with a 60 horse-power Niagara motor. The "Tawa" a 42′ cruiser with a 30 horse-power Ralaco motor for Geo. E. Ketcham, of Toledo, O., has recently been completed.

Among the foreign orders recently received, there is the custom house launch, the "Roza" for Mr. A. Nielsen, of the Custom Department, of Tientsin, China. This vessel is constructed entirely of teak by Chinese labor and is equipped with a 50 horse-power Sterling motor. In Hamilton, Bermuda, Mr. H. C. Masters is building a "V" bottom, high speed cruiser from Mr. Watts' designs, also with a Sterling motor. At Nassau, Bahama Islands, Mr. Jordan Sands is building a fast motor boat constructed of West Indian cedar and mahogany, with a high powered racing engine. A mahogany finished inspection boat for Messrs. Adriao Barroco & Co. with a Mietz & Weiss motor, for use at Manaos, Brazil.

Besides those already building, Mr. Watts, the naval architect, has received orders for the plans of a 54′ auxiliary schooner called the "Pitt" equipped with a 16 horse-power Lathrop motor, for Mr. Geo. W. Pittenger of Chicago, Ill., to be built by Burgher Bros.; a racing ice boat for Lyman E. Brackett, Jr., of Rochester, O.; a cruising motor boat with a Northwestern engine for A. C. Witt, of Haines, Alaska.

A new 52′ express cruiser with a 250 horse-power Smalley engine, for E. F. Mitchell, of San Francisco, Cal. This is the second boat for this owner. A 76′ auxiliary schooner similar to the "Viola II" for Wm. J. Graham, of Indianapolis, Ind.; a 28′ displacement racer for Chas. H. Oelrichs, of Cincinnati, O., with a 60 horse-power Peerless motor; a 45′ auxiliary sloop for Mr. Rosewell Hammond; a 65′ cruiser powered with twin screw Sterling motors, for Jack O. Graham.

In the commercial line activities are even more varied. One of the small boats now building is a 65′ motor paddle-wheel passenger vessel for Fred D. Doty, of Ocean City, N. J.; a 150′ steel, cotton-carrying barge for the Macon-Atlantic Navigation Co. of Macon, Ga., building by the J. S. Schofield & Sons Co., also of Macon, Ga., equipped with two 50 horse-power Bolinders motors; a 117′ twin screw passenger boat for N. Chr. Hansen, of Paraiso, Canal Zone, equipped with two 70 horse-power Fulton-Diesel motors; a 50′ fishing boat for Senor Carmelo Olier, of Cartagena, Colombia, S. A., and a 95′ passenger boat for F. H. Scharsberg, also of Cartagena, Colombia; an 85′ passenger boat for the Nickerson-MacFarlane Machinery Co., Tacoma, Wash., with two 75 horse-power Sterling motors; a 104′ fast, steam passenger boat for the Twin City lines of the Transit Supply Co., now building in the shops of the company at Lake Minnetonka; a 65′ passenger boat for Capt. W. Hill & Co., of Nausori, Fiji Islands, equipped with a 28 horse-power heavy duty Regal motor; a 135′ steel, twin screw, freight and passenger boat for W. J. Dunn, of Galveston, Texas; an 87′ tug for the Poitevant & Favre Lumber Co., now building at Mandeville, La.; a 120′ steel cargo barge, building by the Valk & Murdoch Co., of Charleston, S. C.

SEALED PROPOSALS will be opened at the Bureau of Lighthouses, Department of Commerce, Washington, D. C., on April 27, 1915, and also on the same date at the Office of the Lighthouse Inspector, San Francisco, Cal., for constructing the steel lighthouse tender "Cedar," about 1750 tons displacement. Particulars may be obtained upon application to the Bureau of Lighthouses, Washington, D. C.

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THE NATIONAL TUBE AT THE EXPOSITION.

The United States Steel Corporation and subsidiary companies occupy a very large section of the Mines and Metallurgy Building at the Panama-Pacific Exposition. The National Tube Company exhibit occupies two sections with an extensive display of tube and pipe products and specialties. As far as possible, everything about the exhibit is tubing, even the chairs and settees being made up of tubing of different section. The great variation in shape of the tubing manufactured for different commercial purposes is well illustrated by a beautiful lace pattern displayed under glass. This lace work has been made up of sections of different tubular products set on end and is a revelation of the wide uses to which tubing has been adapted. As is natural in an exposition staged in California, great prominence is given to oil and artesian well casings. Interesting pieces of tubing removed from deep wells are shown. One of these was blown up from the bottom of a well to the surface, a distance of fifteen hundred feet, by a charge of dynamite, and this tube, though crumpled up like an accordeon, is intact. Valves, Kewannee unions and other specialties are displayed in attractive cases, many of these being cut through the stem, seat and packing glands so that the interior construction is plainly visible.

The moving picture in the Panama-Pacific Exposition has taken the place of heavy machinery in a great many cases as a means of demonstrating the process of manufacture, and the United States Steel Corporation have their own "movie" apparatus and daily show eight hours of reel without repeating. As these pictures are shown, different lecturers explain the processes depicted. A complete program of the subjects covered and the hour of presentation is furnished so that anyone interested in any particular phase of the steel industry can, by consulting the program, so time himself as to see only what he desires.

The United States Steel Products Company exhibit also holds much of interest to those interested in marine matters. The Lake Transportation section, the exhibit of special ship shapes and the steel manufacture section should also prove highly interesting, while the structural steel, railway products, tin plate, wire products will attract the attention of all engineers. An exhibit of safety, sanitation and welfare illustrates the efforts of this corporation to improve working conditions and raise the standard of efficiency and earning power of its employees. In this regard stimulative helpfulness has been aimed at and every effort has been made to avoid charity. To help the employees help themselves, is the governing principle throughout the extensive welfare department.

A model of the ore dock, at which a record was made of loading 14,000 tons into a vessel in 70 minutes, is of special interest, as it illustrates what is possible with machinery as far as bulk cargoes are concerned. The exhibit of the United States Steel Corporation and its subsidiaries represents an outlay of about $250,000, and is one that will well repay a full day's study.

NEW SEABURY MOTOR.

Among the entirely new engines of the Season of 1915 is one of particular merit for many reasons, foremost among which is that it is claimed to be noiseless, oilless and vibrationless.

This engine, while of the heavy duty or cruising type, is not of the heavy engine type, so that it does not overburden a reasonably small vessel requiring the propulsive power of its rated capacity of 120 brake horse-power.

All working parts of this advanced type of "Speedway" engine are enclosed, so that not a drop of oil can work its way from the engine into the bilges, and those who have suffered the evils of dirty, oily bilges will well appreciate this advance in design.

Although of 120 B. H. P., this heavy duty motor weighs but 5000 pounds, **including its air-starting system,** which is a built-in part of the machine. The cylinders are of the twin type, 6¾ inches bore by 8½ inches stroke, and the revolutions number 500 to 600 per minute for a rating of 100 to 115 H. P.

The magneto is of the Bosch waterproof two-spark type; a springless carburetor is fitted, as is also a double-acting bilge pump, double-acting piston with circulating pump, gear oil pump inside of engine housing and large noiseless air pump to supply compressed air for starting the engine and for the whistle, etc.

The working parts of this engine are automatically oiled by means of a force oiling system, the oil being forced through the crank shaft and from there to all the other working parts, including the gears in the reverse clutch. The oil can be regulated to any desired pressure, which pressure is indicated on a gauge mounted on the engine. The amount of oil contained in the engine oil-well will lubricate the engine for thirty days without renewal. Numerous and extra large handhole plates are provided for easily cleaning, etc.

At a recent test before a number of engineers of prominence, the engine ran so smoothly that, though at full power, it was difficult to tell whether or not it was running. This engine attracted considerable interest among engine experts at the recent Motor Boat Show, and they particularly noted the ease with which valves could be removed without disturbing the cylinders such as is the case with some other engines of the larger twin cylinder types.

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WATER SOFTENING.

The Sorge-Cochrane hot process system of softening boiler feed water is described in a 20-page pamphlet lately issued by the Harrison Safety Boiler Works, Philadelphia, Pennsylvania. This process is based upon the fact that chemical reactions are more rapid and complete in hot water than in cold water, and the precipitates, less soluble and coarser, so that they settle more rapidly. It is claimed that for these reasons more complete elimination of scale-forming matter is possible with an apparatus of a given size and with a given amount of reagent than if the water be treated cold, and that since the boiler feed water should be heated in any case, the hot process is the logical system to use for preventing scale in boilers. In the Sorge-Cochrane hot process system the heating and chemical treatment apparatus are combined, the heater portion being similar to the Cochrane open feed water heater. The water is first heated by exhaust steam while falling over trays, after which suitable chemical reagents are added as the water enters the reaction and sedimentation chambers, passing thence to the filters. Suitable construction is provided to facilitate the removal of sludge, the feeding of chemicals, the cleaning of filters, etc. Analysis representing results obtained in practice show that it is possible by this system to reduce the total scale-forming solids to as low as ½, 2/3, 1½ and 2 grains of scale-forming solids per gallon, while using only a very small excess of reagent, which is desirable in order to avoid the tendency of foaming in the boilers. The fact, which has been deducted from reports by boiler inspection and insurance companies, that over 50% of all boilers in use are defective by reason of the scale-forming water, should render this booklet of urgent interest to owners and operators of steam power plants.

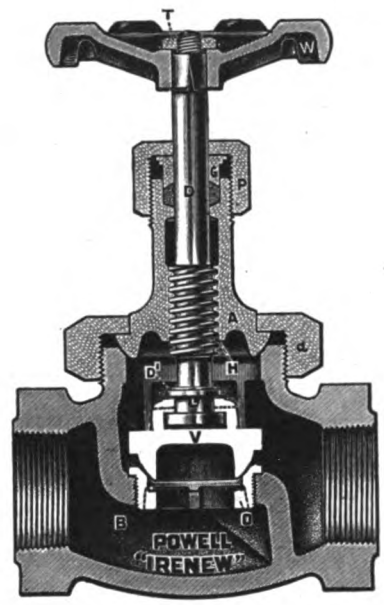
PUBLICATIONS.

The Annual Report of the Isthmian Canal Commission for the fiscal year ending June 30, 1914, is a volume of entrancing interest. The text, comprising 600 pages, is well illustrated with photographs and the separate assembly of diagrams, maps, etc., form a tangible and graphic story of progress and achievement in the Canal Zone. This report embraces the most fascinating period of the canal's construction, bringing the work along to the time of the first passage of ships through the great waterway.

The Annual New Year's number of "Syren and Shipping Illustrated," issued January 4, 1915, constitutes a remarkable indication of the stability of shipbuilding, marine engineering and allied industries in Great Britain after six months of a great war.

A NEW POWELL VALVE.

The cut herewith illustrates the new "Irenew" valve, an output of the Wm. Powell Company, upon which they have spent a great deal of time and study in order not to miss any of those "little" points that go to make up durability, long service and economy in valves of all classes. The new model valve is manufactured in Globe, Angle, Cross and Check Valve patterns and with screwed ends. The packing nut is made large and roomy with plenty of space for packing material around the stem. The bonnet with cone (A) is made with



A new "Powell" production.

a beveled face connection similar to a ground joint union. This is an improvement over the old inside thread, red leaded. The collar on the stem "Di" and the recess on the bottom of the bonnet "H" allow repacking of the valve when wide open and under pressure. The seat ring "O" is cast of white "Powellium" bronze, a non-corrosive metal applicable to most temperatures of superheated steam or cyanide solutions. This is easily renewed by unscrewing the seat ring by means of a flat tool of any kind. The renewable horseshoe disc "V," which eliminates a locknut, is a great improvement over old methods. It is arranged to slide over the head of the stem into a socket permitting it to swivel freely. The disc is cast of White "Powellium" bronze insuring it an extremely long life. The valve seat can be easily reground without disconnecting the valve from its pipe line. These valves are well known for their thorough workmanship, are carefully tested to twice their working pressure and carry the unconditional guarantee of their makers.

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The Ross Schofield Company report the following list of recent installations of the Ross Schofield system for promoting circulation in steam boilers: The "Britannic," "Germanic," "Athenic," "Corinthic," "Ionic" and "Irishman" of the White Star Line with a total of 281 furnaces; the "Metapan" of the United Fruit Company, with 15 furnaces; the "Essex," of the Merchants' and Miners' Steamship Company, with 8 furnaces; the "Dochra," "Surugan" and "Satsuma," of the Barber and Company fleet, with 21 furnaces; the "International," of the International Elevator Company, with two furnaces; the "Irvington," of the Lehigh Valley Railroad Company, with 4 furnaces; the "E. F. Moran," of the Moran Towing Company, with 3 furnaces; the "City of Sydney," of the Dominion Coal Company, with 8 furnaces; "the Statendam," "Oosterdijk," "Westerdijk," "Nooderdijk," "Zuiderdijk" and "Zyldijk," of the Holland-American Line, with a total of 150 furnaces; the "Norwegian," "Nortonian" and a new steamer for the Leyland Line with a total of 42 furnaces; the "Appenine," "Austriana," "Birmingham," "Boliviana," "Braziliana," "Dettingen," "Egyptiana," "Hockelaga," "Indiana," "Lingan," "Norfolk," "Persiana," "Richmond," "Tunstall," "Crown Point," "Eagles Point," "East Point," "North Point," "South Point," "Start Point," "West Point," "Caterino," "Crosby," "Feliciana," "Cristano" and "Rossano" of Furness, Withy and Company, with a total of 179 furnaces; the "Kylemhor" of the Abram Addie and Cousins Fleet, with 6 furnaces; three new steamers for Richardson and Westgarth Company, with 24 furnaces; eight steamers of the Scrutton and Company fleet with 50 furnaces; the "Duke of Montrose" of the Caledonian Steam Packet Company, with 4 furnaces; two steamers of the C. G. King and Company's fleet with 5 furnaces; two tugs of the Conqueror Towing Company, 9 furnaces; one tug of the Britannia Towing Company, 2 furnaces; the "Sirius" of the Royal Holland Steamship Company, with 6 furnaces; the "Houtman" of the Royal Packet Company, with 12 furnaces; three steamers of the Furness Shipping and Agency Company, with 26 furnaces; two steamers of the Royal Holland Lloyd, with 38 furnaces; two steamers of the Arthur Holland and Company fleet, with 10 furnaces; five boats of the Swansea Harbor Trust, with 10 furnaces; two new steamers building by Harland and Wolff, with 96 furnaces; a new steamer for the Atlantic Transport Company, with 36 furnaces; the steamer "Philadelphia," with 34 furnaces; the "Samland," of the Red Star fleet, with 60 furnaces; twenty-three steamers of the Haakon Larsen fleet, with 100 furnaces; two steamers of the Rotterdamsche Lloyd, with 24 furnaces; fourteen steamers of the German-American Petroleum Company, with 101 furnaces, and the "Lewis Luckenbach," of the Luckenbach Steamship Company, with 9 furnaces. This makes a total of 127 steamers with the Ross Schofield device adapted to boilers with a total of 1403 furnaces.

COMMERCIAL SHIPBUILDING ON THE HARLEM.

The recent dredging operations on the Harlem River, New York City, have made it possible for the construction and navigation of larger vessels through that waterway connecting the Hudson River with Long Island Sound. As a result the large shipbuilding and repair plant of the Gas Engine and Power Co. and C. L. Seabury & Co., Consolidated, at Morris Heights on the Harlem, is prepared to take full advantage of its building equipment which can handle wooden or steel vessels up to 300 feet in length and of draft up to 14 feet. Propelling engines of the reciprocating and Curtis turbine type, the Seabury water tube boiler, condensers, steam blower and steering engines, and gasoline generating sets for the auxiliary electric lighting of passenger and commercial vessels and yachts, in fact, vessels complete, are all built at these works.



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TENNESSEE RED CEDAR.

The atmosphere in the vicinity of Fifth and Brannan streets, San Francisco, is redolent with a most pleasant and pungent odor. The cause is not far to seek as one's olfactory organs following this scent will lead them directly to the pioneer hardwood house of White Brothers, who are just at this time getting in a carload of Tennessee Red Cedar, the wood from which the cedar chests are made. This aromatic Red Cedar comes in small boards 1x4" to 8" wide, 4 to 8 ft. long and is, moreover, chock full of knots. These, however, finish up perfectly smooth and do not detract from but rather add to the beauty of the finished chest. Each board also shows sap so that a finished chest presents a rather spotted and variegated appearance. The wood is very highly prized for its distinctive odor, which is claimed to prevent the encroachment of moths. Not only are chests made of Red Cedar but in the best houses the entire closets are lined with this wood. White Brothers have a large stock of it always on hand.

The veneered panel is now well established as a superior material for finishing purposes. The strength, serviceability and staying qualities of the veneered panel have earned it a permanent place in marine work as well as on land. White Brothers, the well-known hardwood dealers of Fifth and Brannan streets, San Francisco, handle a practically unlimited variety of the firmly established Wybro panels. These panels range in size up to the largest practical units for panel work and are either three or five-ply with either one or both sides finished as desired. The wide variation obtainable may be partially realized from the fact that these panels may be had in ash, hungarian ash, basswood, birch, curly birch, elm, southern red gum, satin walnut, Oregon pine, mahogany, quartered oak, Hawaiian koa, genezero, circassian walnut. quartered southern red gum, maple, birdseye maple, eastern yellow pine, plain oak, etc.

DIESEL ENGINES ON THE SOUND.

Arthur Fuller, Pacific Coast agent for the Nlseco Diesel engines, announces the sale of a 4-cylinder 120 H. P. engine to the Alaska-Pacific Fisheries. This engine is to be installed in a cannery tender, 75′ x 18′ x 8′, designed by Lee & Brinton, and now building at the yards of Martinolich at Dockton.

Mr. Fuller states that his principals, the New London Ship & Engine Company of Groton, Ct., have under construction over 100 engines in units of from 120 to 500 H. P. each, and that the Nlseco works are running 24 hours a day with 1200 men employed.

Cochrane Multiport Valves, a booklet of 72 pages just issued by the Harrison Safety Boiler Works, Phila., describes the multiport valves introduced by that concern for back pressure relief and vacuum service, flow service in connection with mixed flow turbines, and check valve service with bleeder or extraction turbines. The essential idea of the multiport valve is the use of a number of small disks instead of one large disk, in order to secure greater safety, quietness, lightness of moving parts, and tightness. The several disks are each fitted with an independent dash pot held to seat by independent springs, the tension of all the springs being adjusted simultaneously by a pressure plate, the position of which can be changed by means of a hand wheel on the outside of the casing, thus there are no parts directly connected to the disks themselves extending through the casing, hence no possibility of binding, as by overtightening of glands, or of tying down or overweighting, the movement of the pressure plate being definitely limited. Another advantage claimed is the ability to adjust the back pressure quickly and easily by changing the position of the pressure plate, which may be done from any distance, as by means of chains or rods. For vacuum service the construction is practically the same, except provision is made for water sealing. For flow service with mixed flow turbines, balance pistons are connected to the disks in such a way that the latter will not open except when the pressure in the exhaust steam pipe is greater than atmosphere. It is thus impossible where one of these valves is used, for vacuum from the turbine to back up into the engine exhaust line through leaks or piston-rod or valve-stem packings. The multiport check valve is designed for use with extraction or bleeder turbines, to prevent reverse flow and consequent overspeeding of the turbine. In addition to full descriptive and tabular matter, the book contains numerous diagrams and layouts, also data on the effects of air in condensers and upon turbine performance.

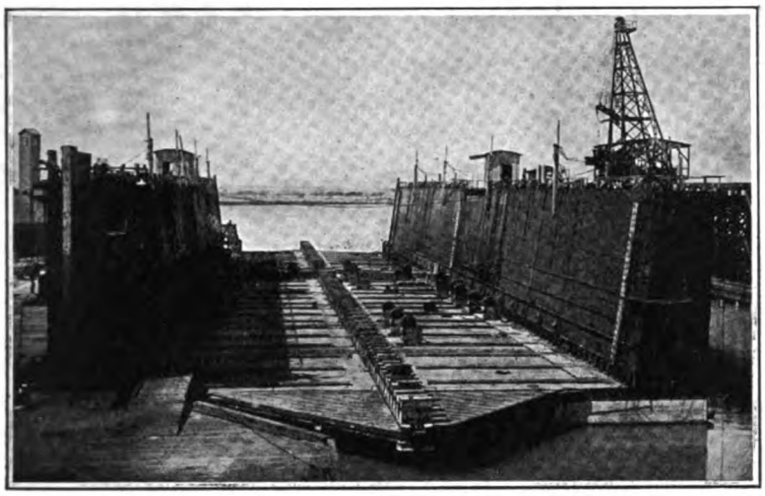
A HANDY CHART TABLE.

Messrs. Kelvin, Bottomley and Baird, nautical instrument makers of Glasgow, Scotland, have lately put upon the market a device known as the "Fletcher 'Lit-from-below' Chart Table." The table is composed of an outer protecting case and an inner light box having a plate glass cover over which the charts are stretched. Within the box and below the chart are a number of small powered electric lights so distributed as to throw an even glow on the under side of the chart. The intensity of the illumination is controlled by a small hand wheel. There is no escape for the light except through the chart and the effect of a luminous chart is thus obtained. Roomy pockets are provided on each side of the box for dividers, parallel rules, etc.

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HONOLULU FLOATING DRY DOCK

INTER-ISLAND STEAM NAVIGATION COMPANY, L'td., Proprietors



FLOATING DRY DOCK "HOOLANA"

Length—

over keel blocks.....352' 0"
over wings .....301' 9"

Width—

over all .....100' 0"
between wings, top.... 84' 0"
between wings, bottom. 76' 0"

Draft—

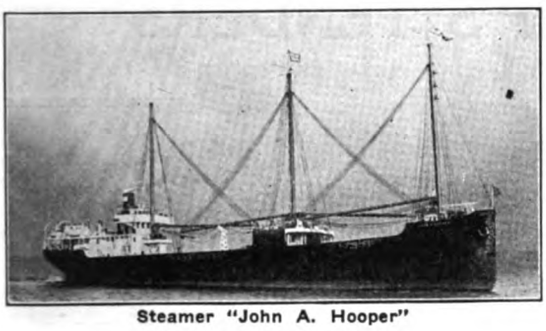
over Keel blocks..... 23' 6"

Lifting capacity .....4500 tons

¶ Unexcelled facilities for Hull or Machinery Repairs of all kinds.
¶ Large Machine, Boiler, Blacksmith and Copper Shops, Foundry and Galvanizing Plants, equipped with modern tools for handling work of any size with despatch.
¶ Compressed Air and Oxyacetylene Apparatus available.
¶ Artesan Well Water supplied to shipping from Company's well.

INTER-ISLAND STEAM NAVIGATION CO., L'TD.

39 QUEEN STREET HONOLULU, HAWAII



Steamer "John A. Hooper"





Harlan & Hollingsworth Corporation

WILMINGTON, DELAWARE, U. S. A.

Builders of Steel Steamships and Steamboats and steel vessels of every description

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SPECIALTY IN MARINE ENGINES AND BOILERS

Also builders of all-steel, wood, and composite Passenger Coaches, including Sleeping and Dining Cars.

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THE VON HOVELING AMERICAN COMPOSITION CO., LTD.

TRADE-MARK

We beg to advise that from Feb. 1, the name

Von Höveling American Composition Co., Ltd.,

was changed to

The Federal Composition and Paint Co.

Limited

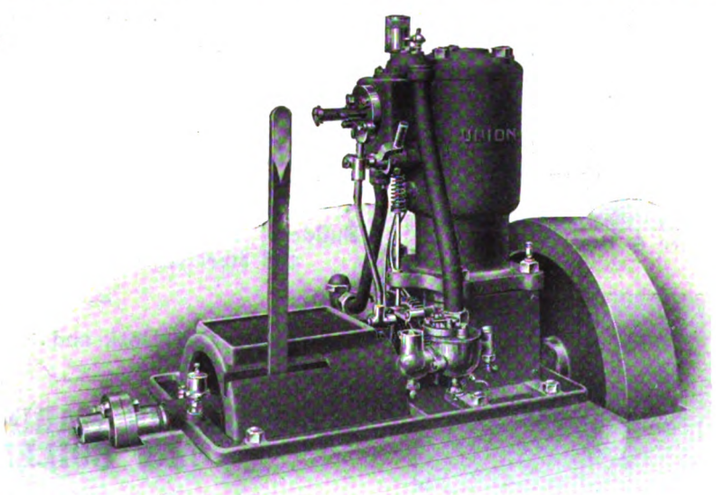
The business will be conducted under the same management and at the same address. The Products will be manufactured by the same process as heretofore, viz.: Von Höveling Process.

THE FEDERAL COMPOSITION & PAINT CO., Ltd.

Andrew Baxter, Director — 17 BATTERY PLACE, NEW YORK

ENGINES FOR SHIP'S TENDERS

UNION Engines Burn Kerosene or Distillate



Compact in Design, Simple to Operate, Easily Accessible

TYPE OF 4 AND 5 H.-P. UNION SINGLE-CYLINDER MARINE ENGINE

The purchaser of a 4 H.-P. Union engine gets the same high grade material and workmanship that has enabled the successful construction of a 600 H.-P. one.

UNION GAS ENGINE COMPANY

SEATTLE — SAN FRANCISCO — LOS ANGELES

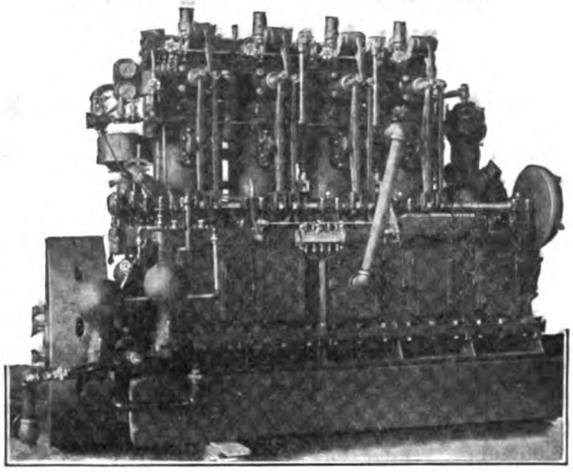
PLEASE MENTION THE PACIFIC MARINE REVIEW WHEN YOU WRITE.

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NLSECO

DIESEL ENGINES

(Adopted by U. S. Government)



240 H.P. NLSECO Diesel. Fuel Cost 30 Cents Per Hour

This engine will be installed in the "Chickamauga," a new tug 70x18x10, for the Pacific Towboat Co. of Seattle.

The "Chickamauga" was launched February 10th and will be the highest powered motor tug on the Pacific.

ARTHUR FULLER, Pacific Coast Agent

NEW LONDON SHIP & ENGINE COMPANY

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Works: Groton, Conn., U. S. A.

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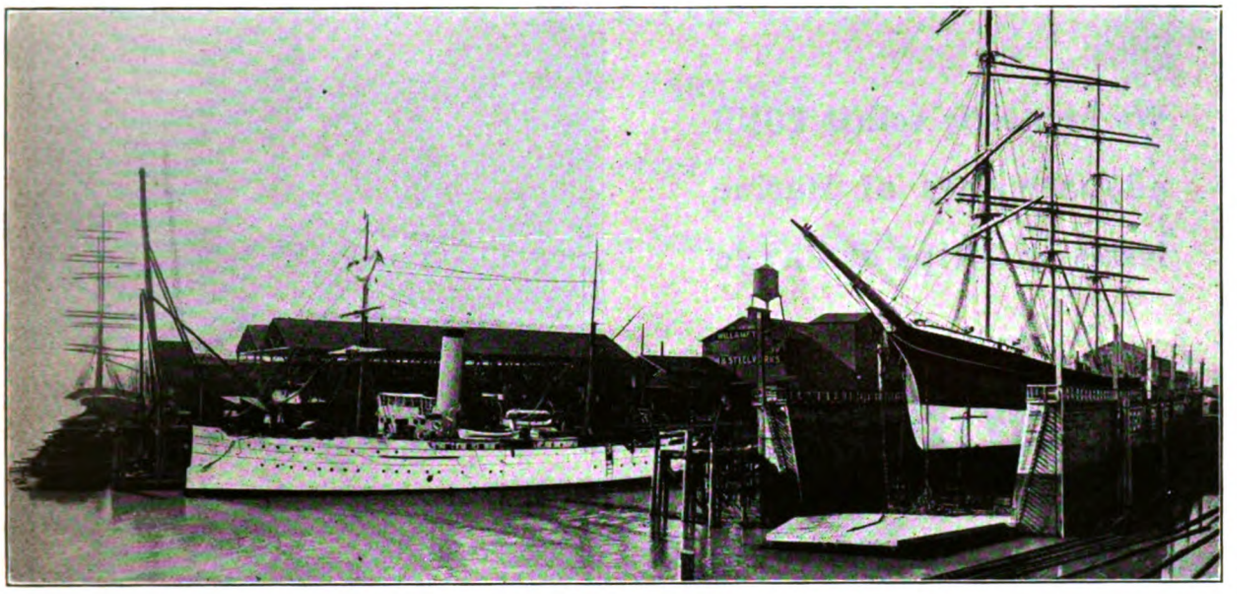
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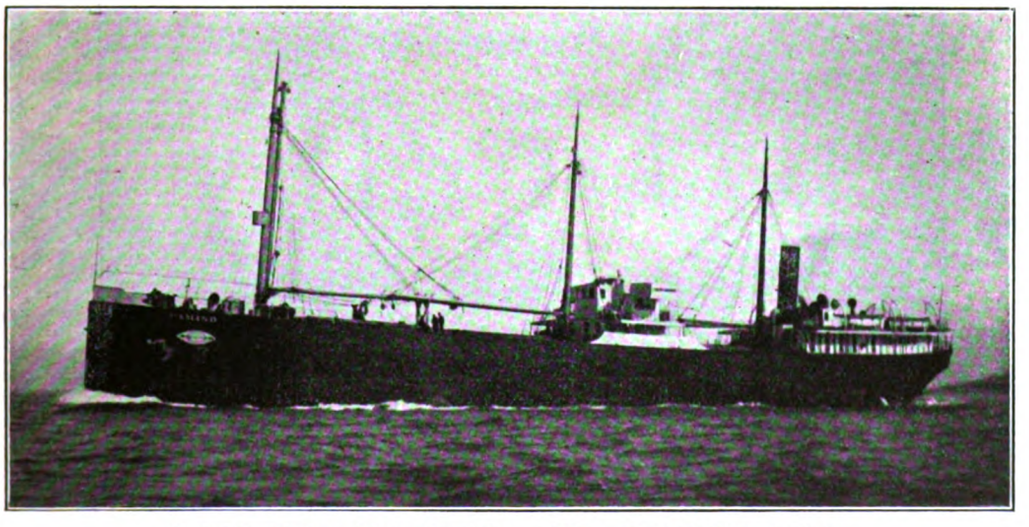
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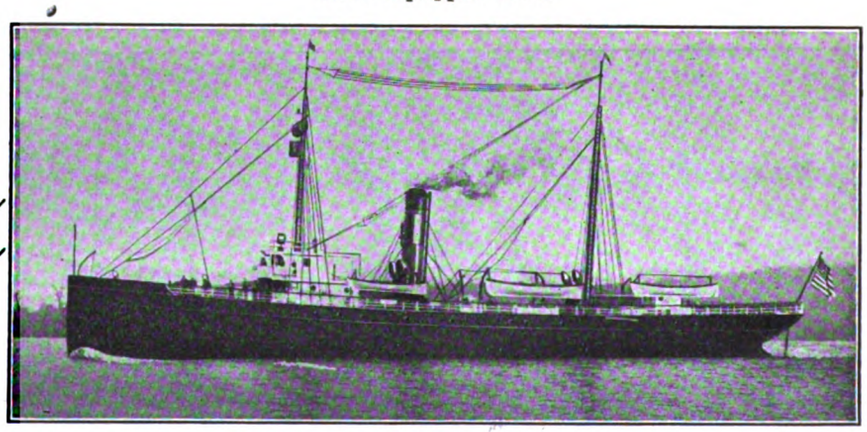
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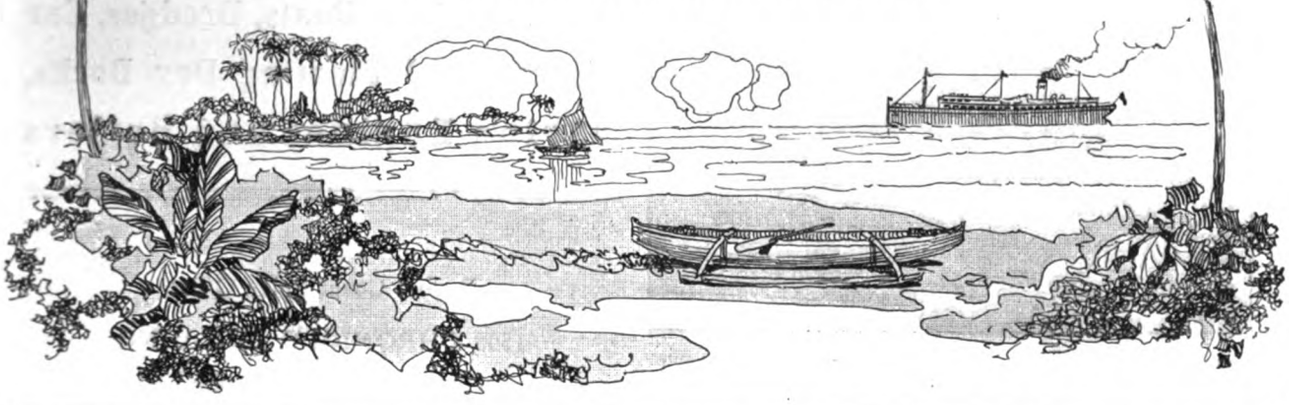
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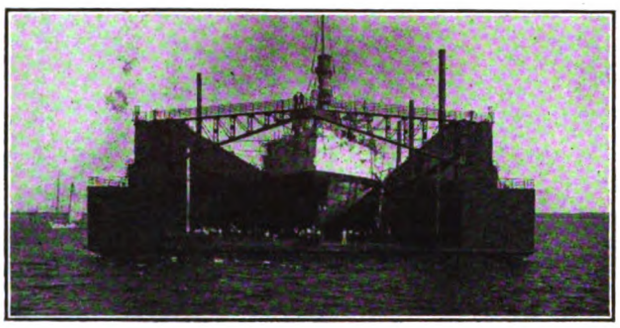
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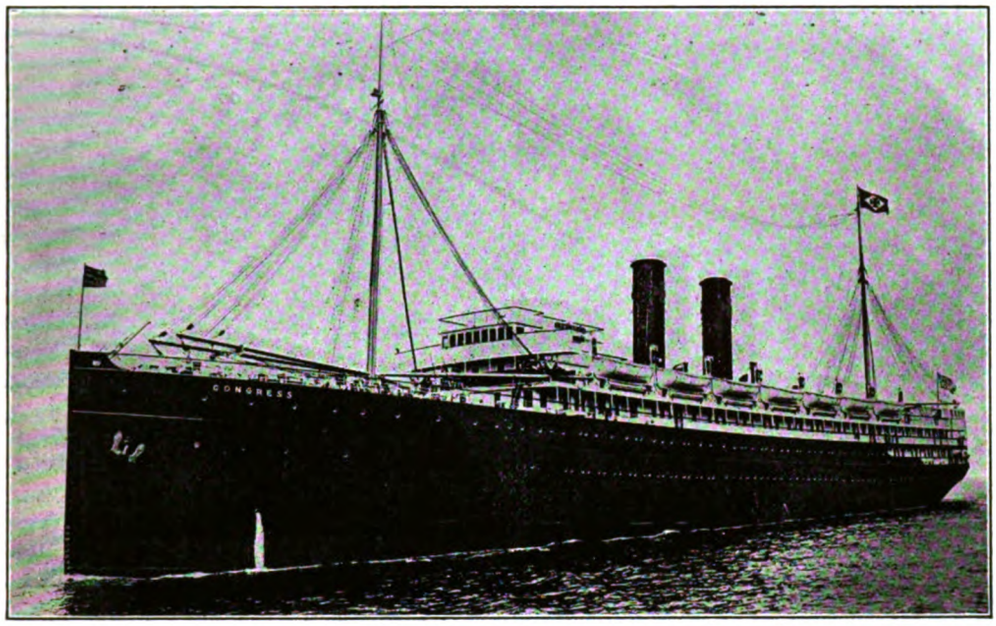
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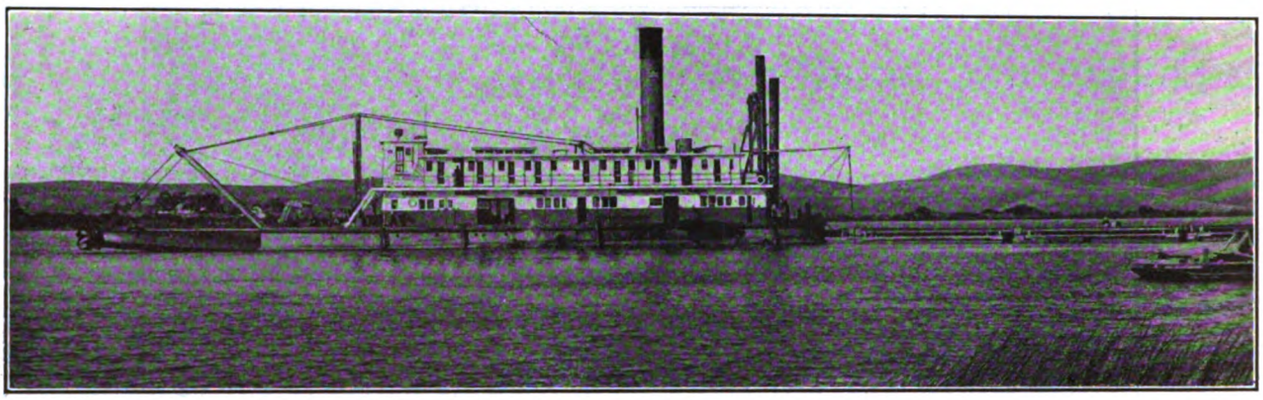
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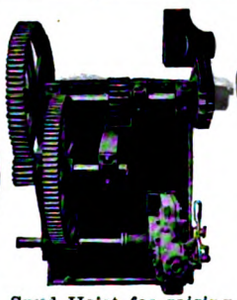
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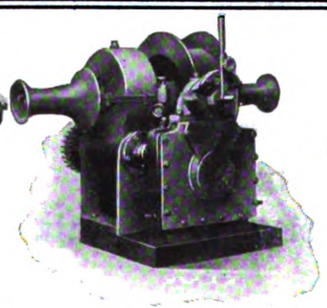
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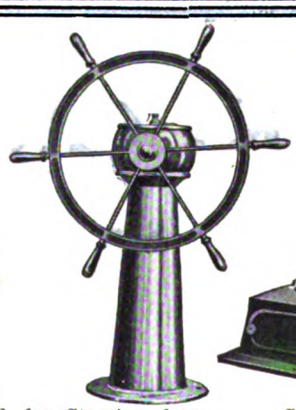
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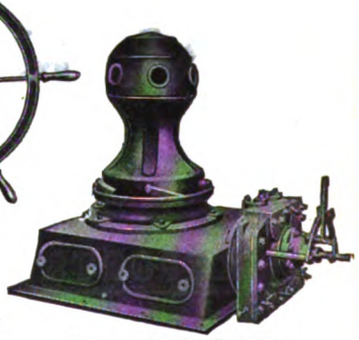
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Standard for Steering from top of Pilot House

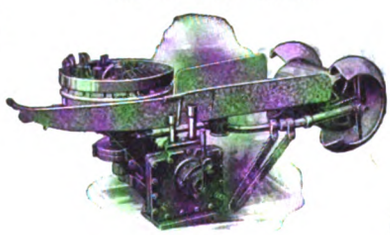


Steam Deck Capstan

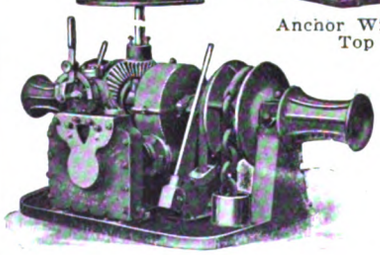




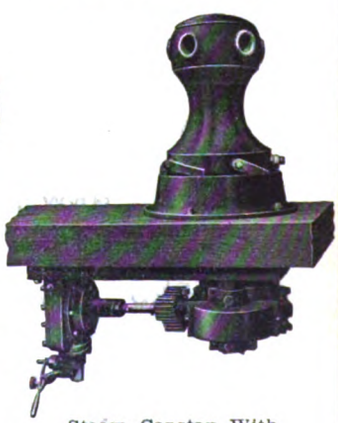
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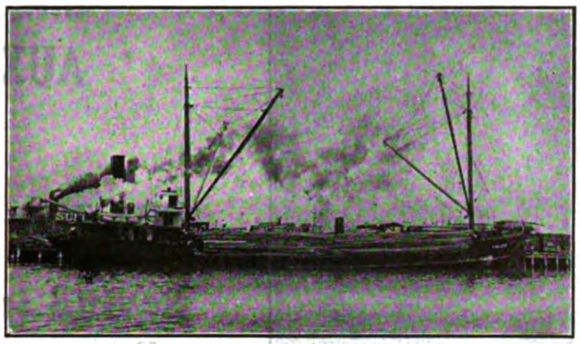
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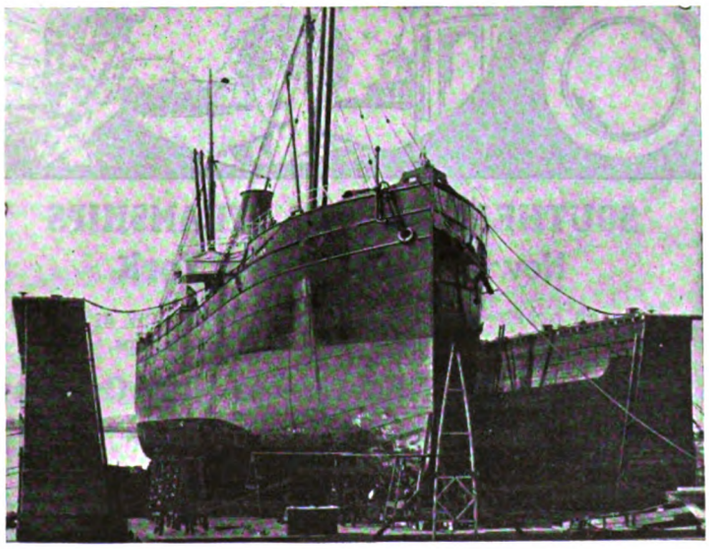
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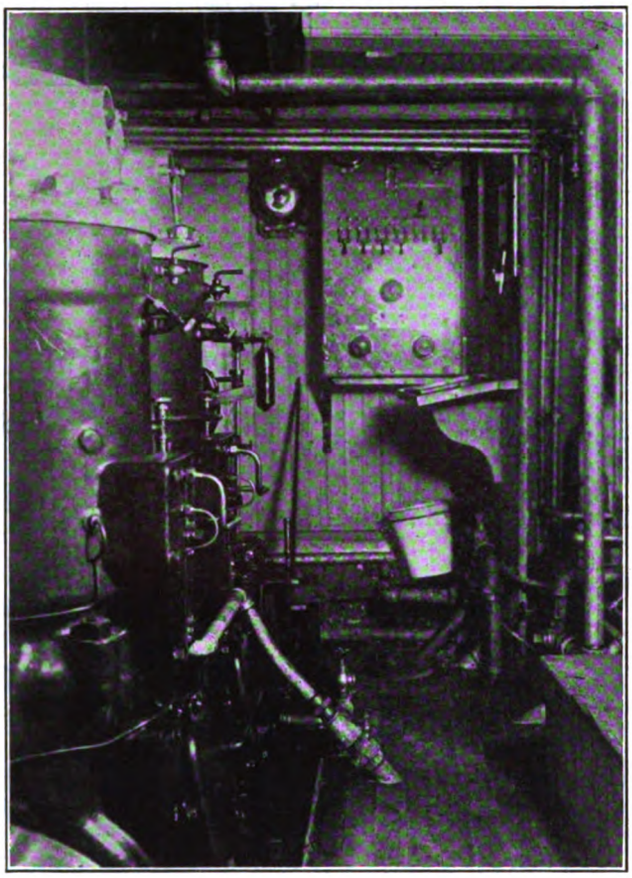
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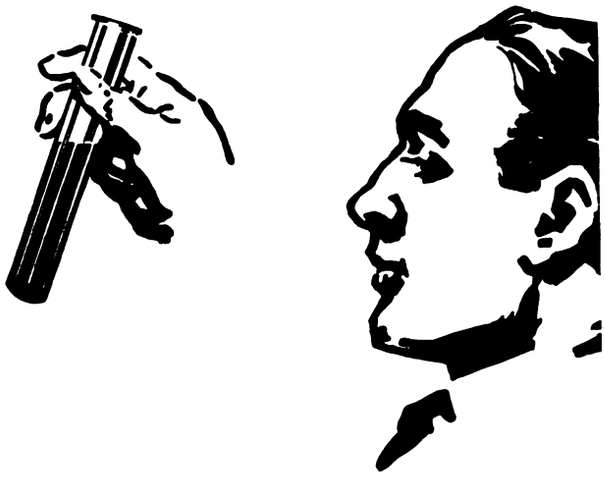
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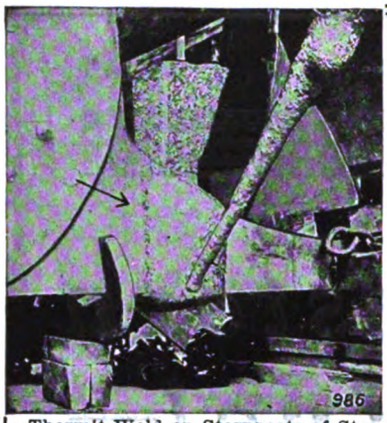
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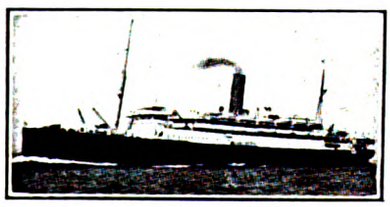
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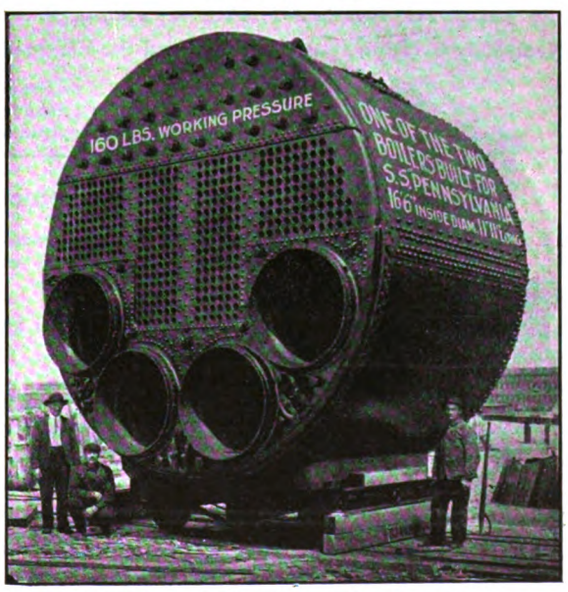
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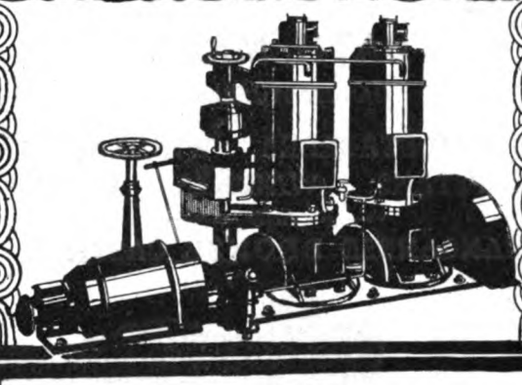
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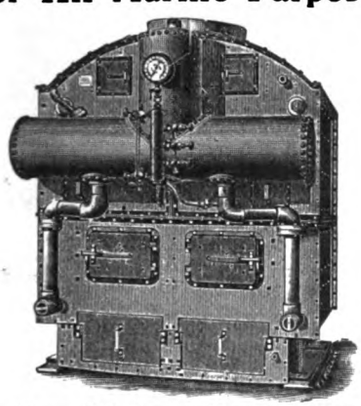
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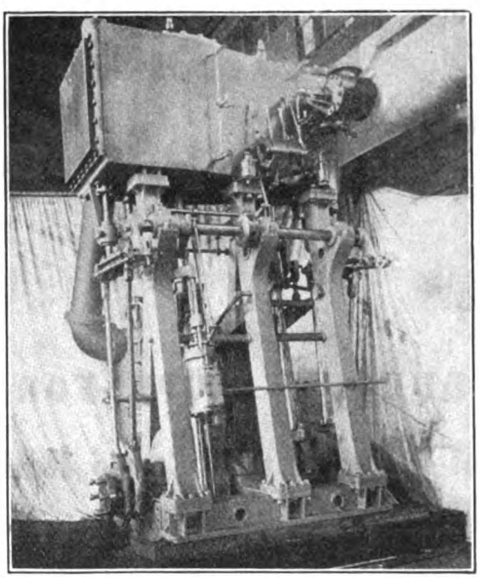
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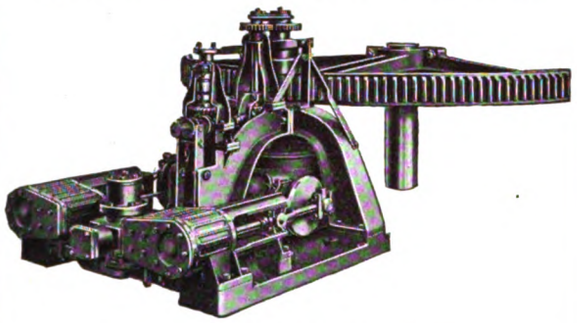
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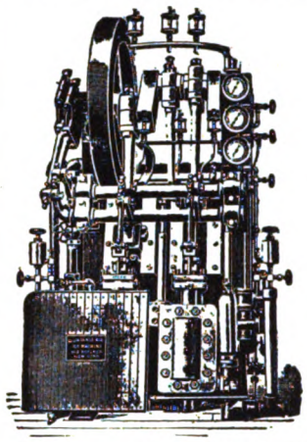
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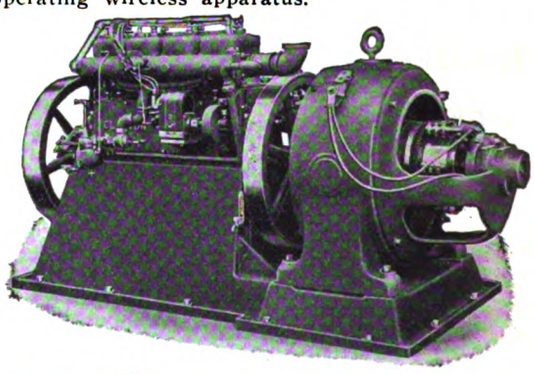
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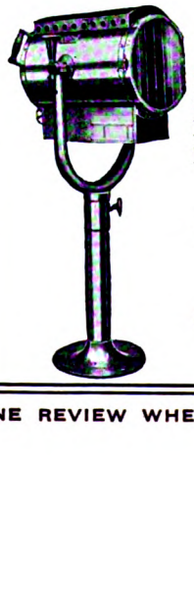
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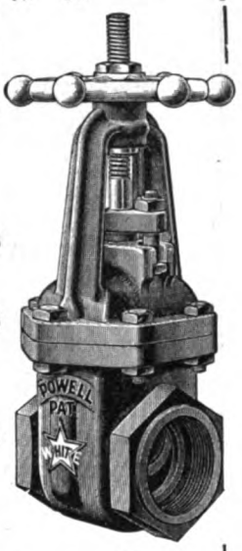
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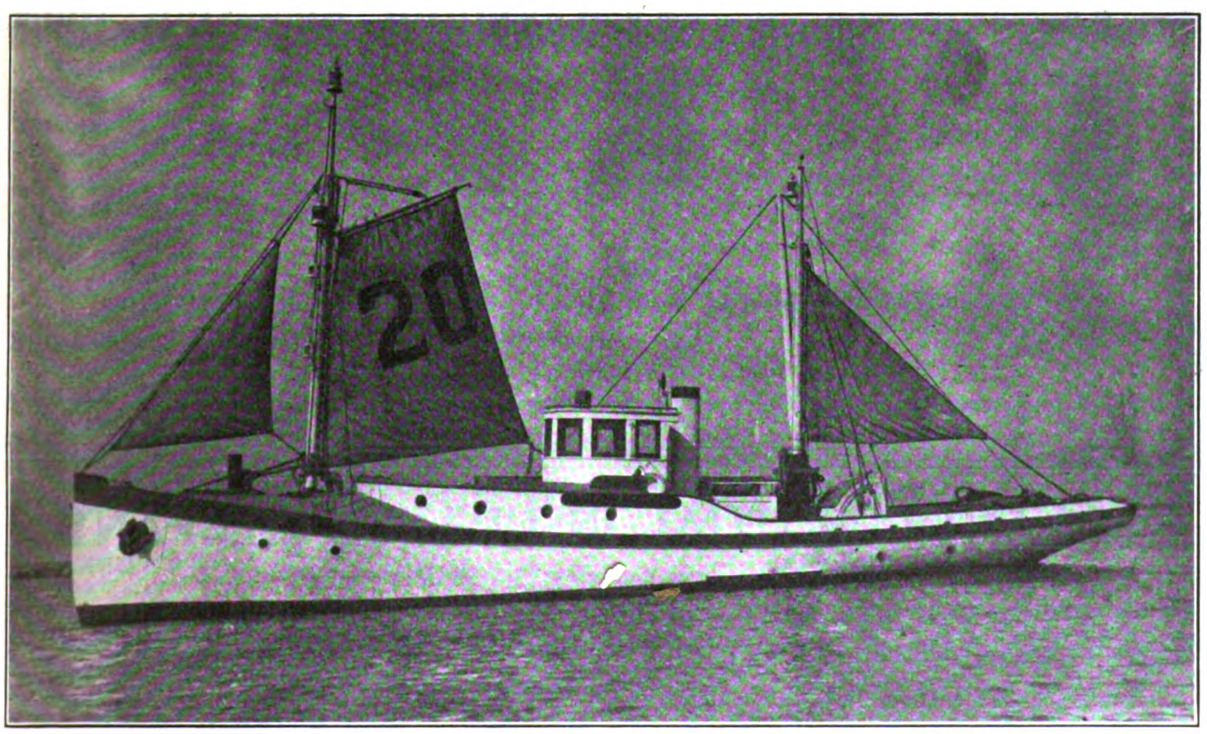
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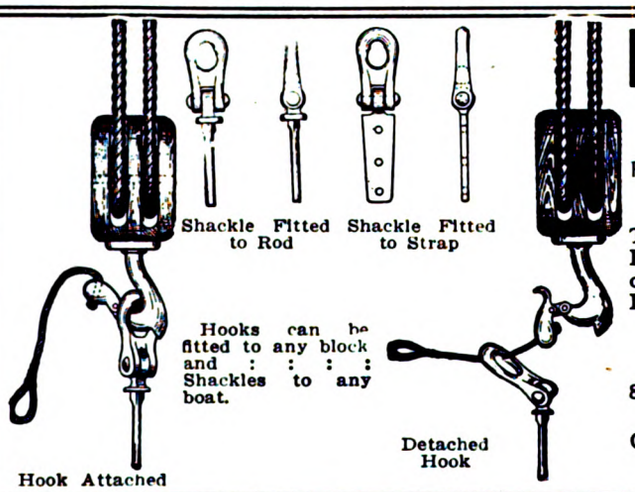
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On December 31, 1913, the assets of the company amounted to		$ 13,259,024.16

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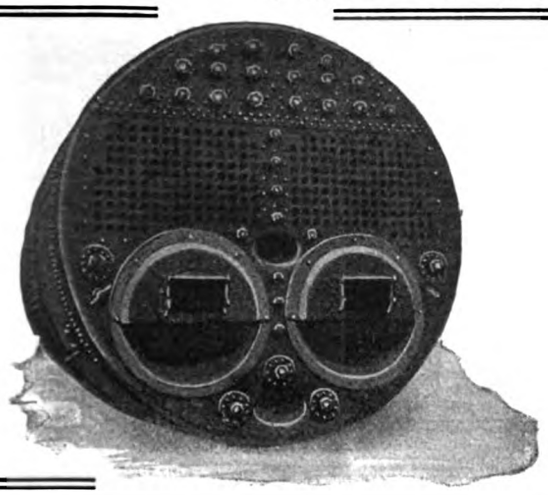
S. S. "F. G. Luckenbach"..From San Francisco, April 6; San Pedro, April 8
S. S. "Damara".....From San Francisco, April 16; San Pedro, April 18
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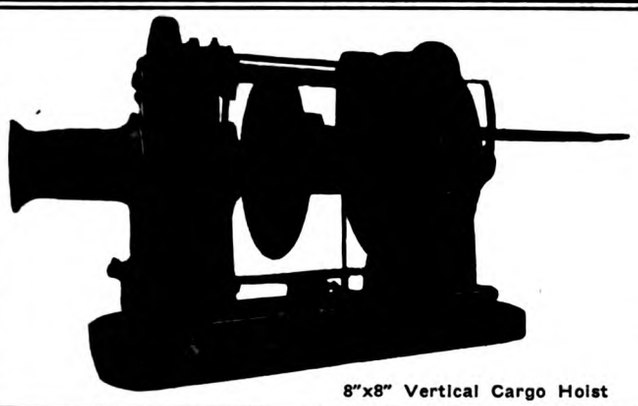


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(LIMITED)

OF HONGKONG, CHINA

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Net Surplus Over Capital (Gold)	2,554,192.31
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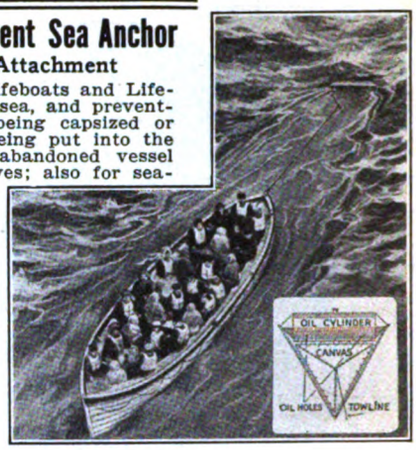
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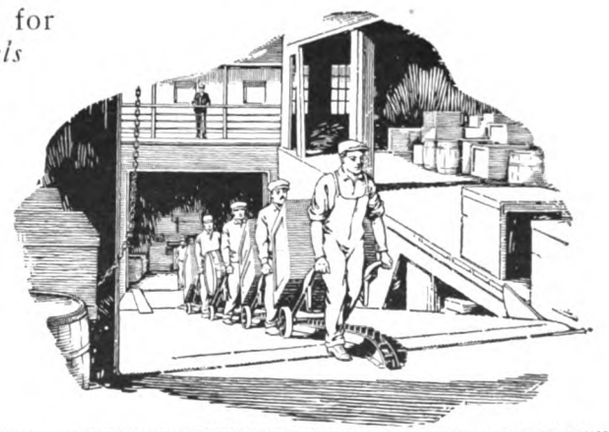
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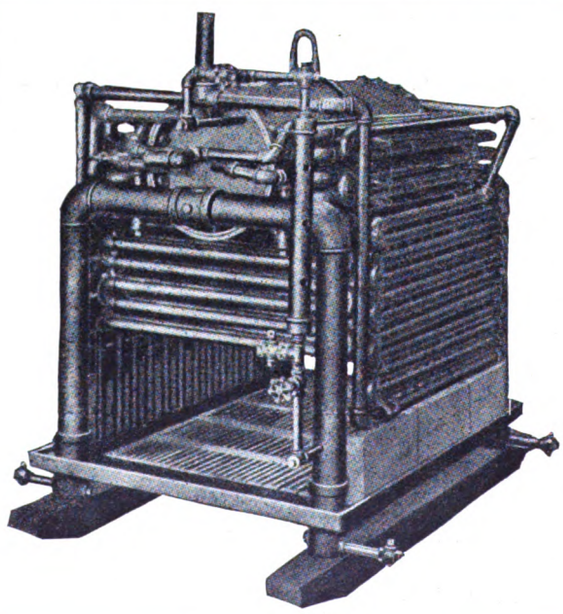
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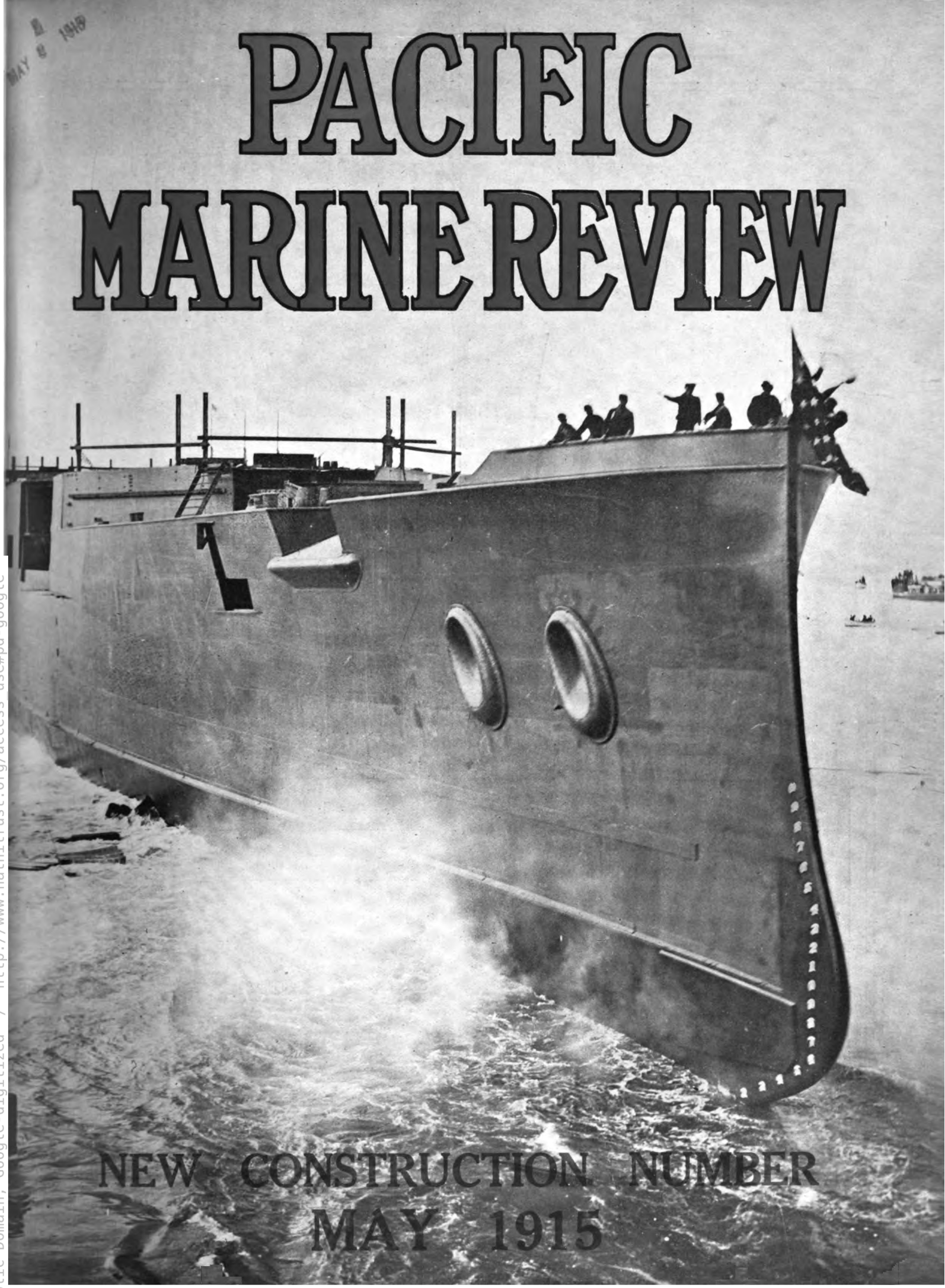
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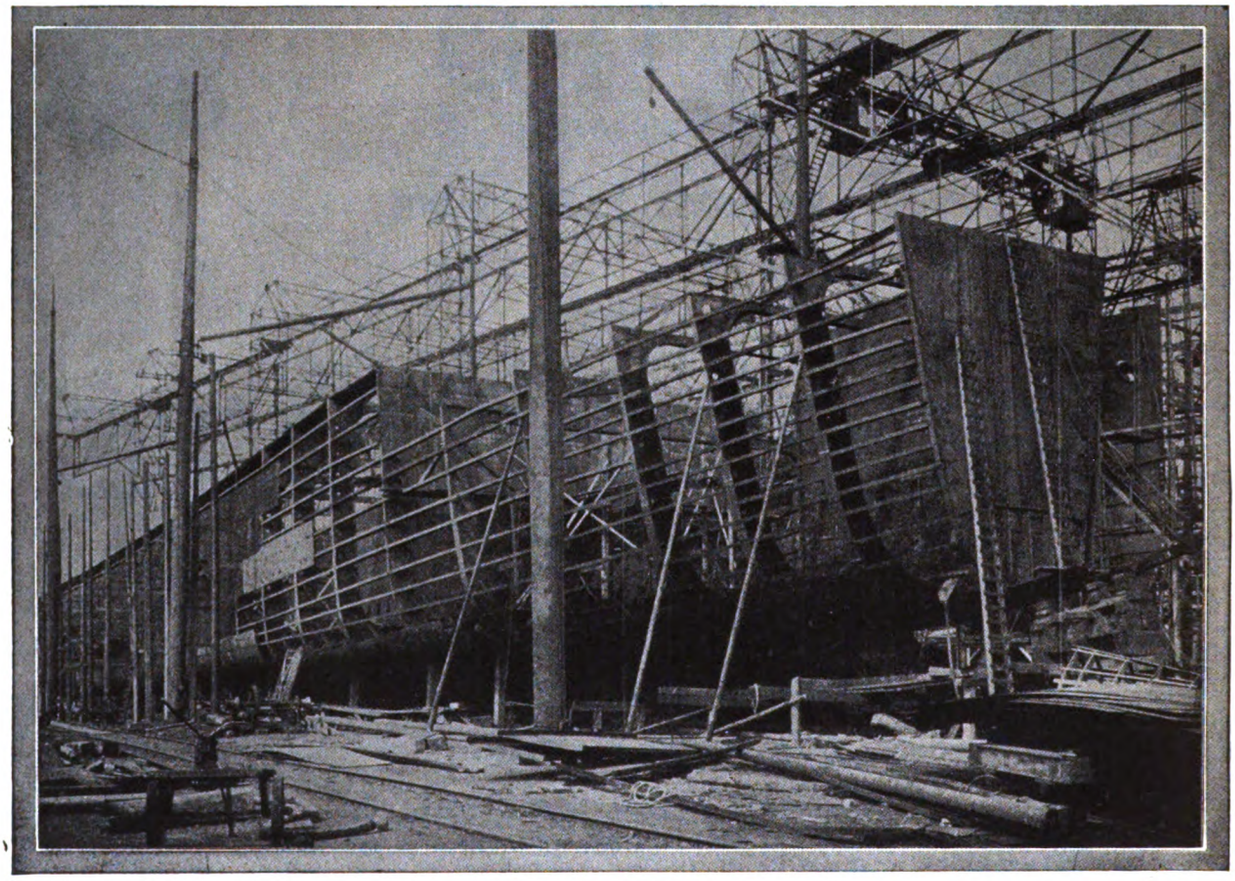
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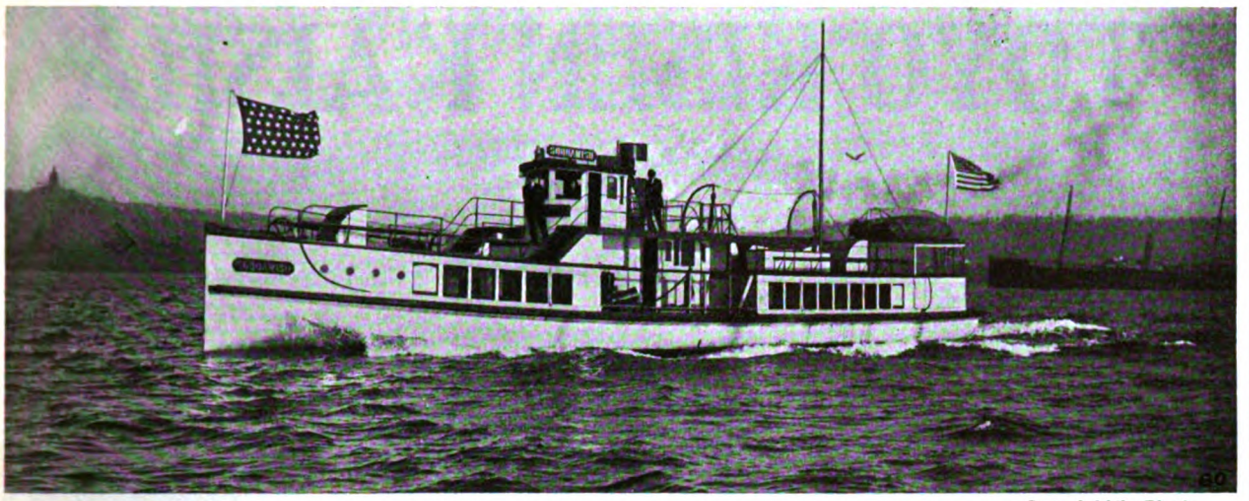
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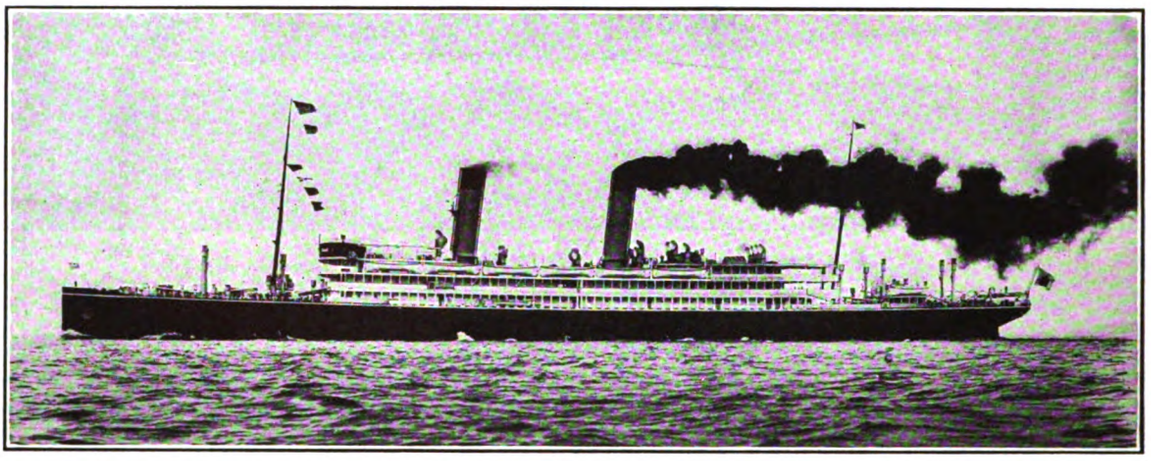
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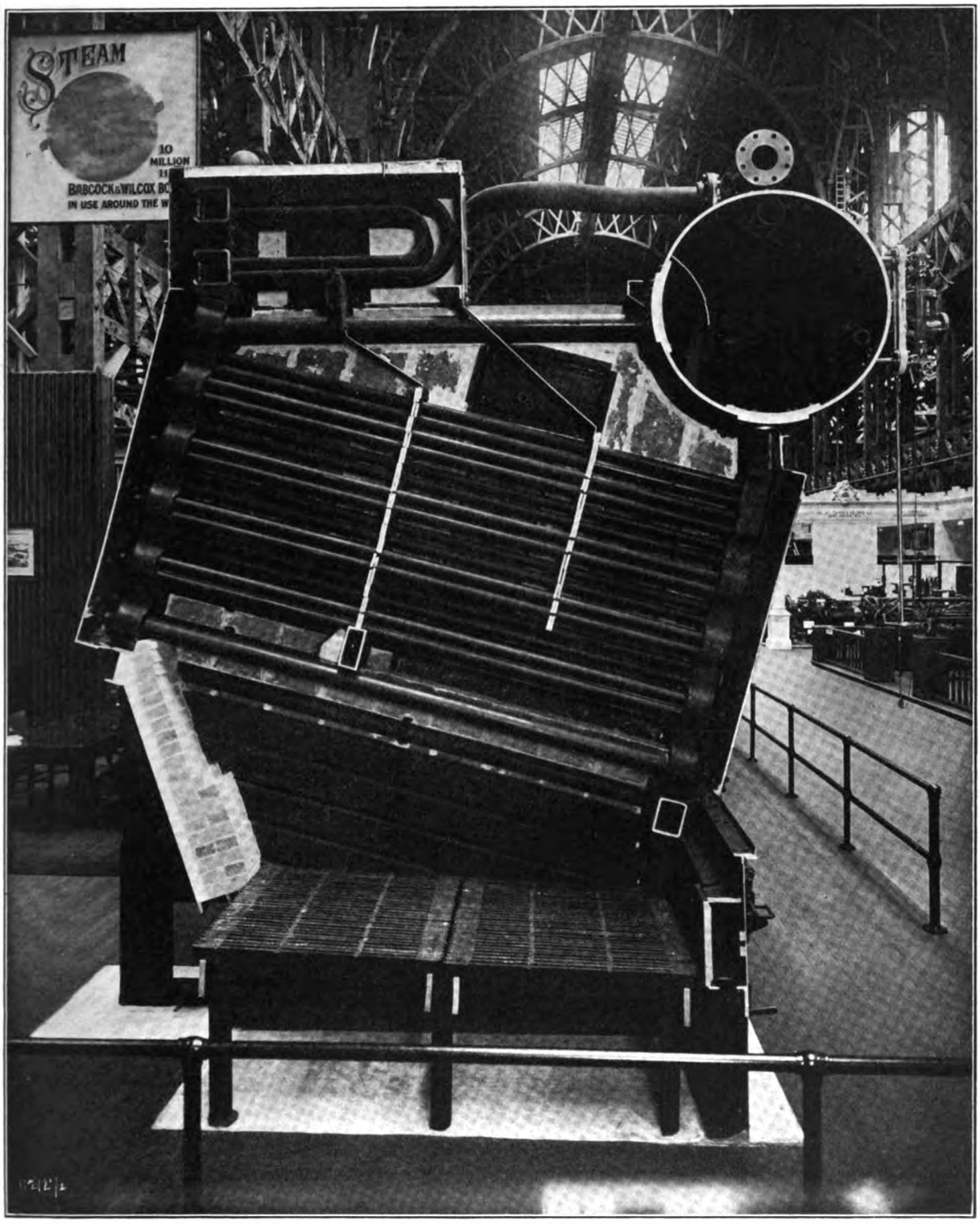
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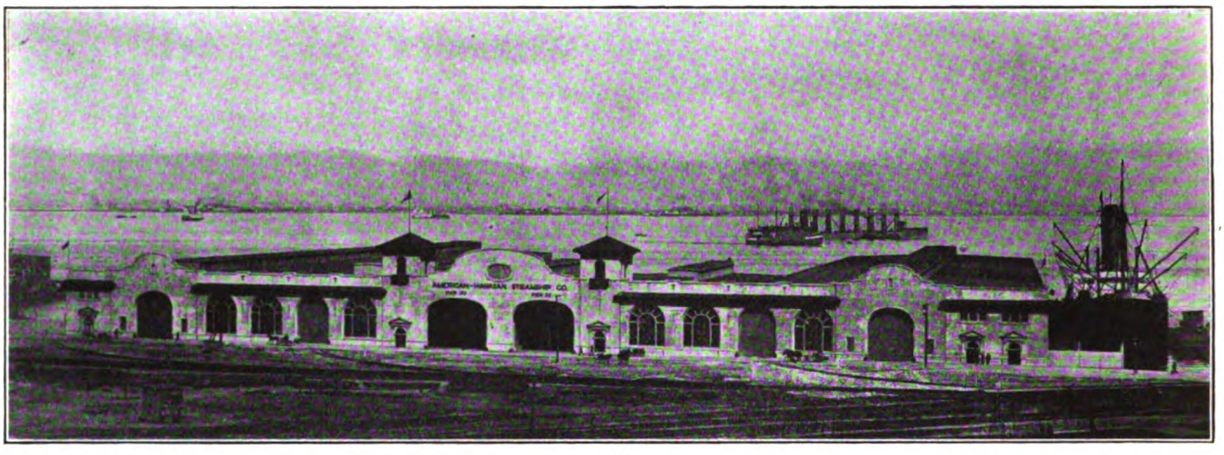
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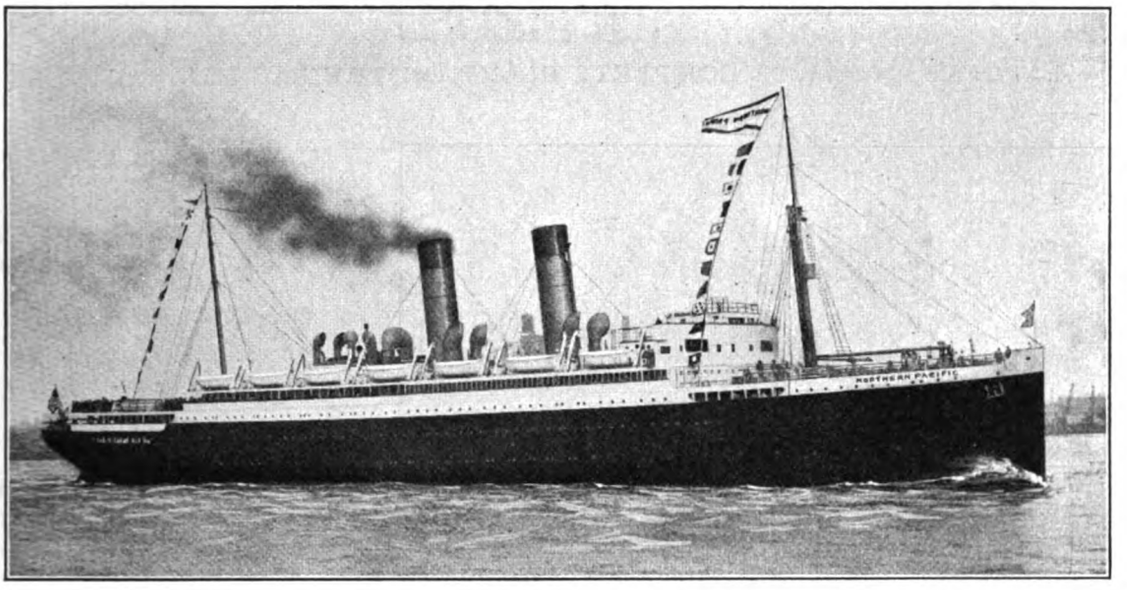
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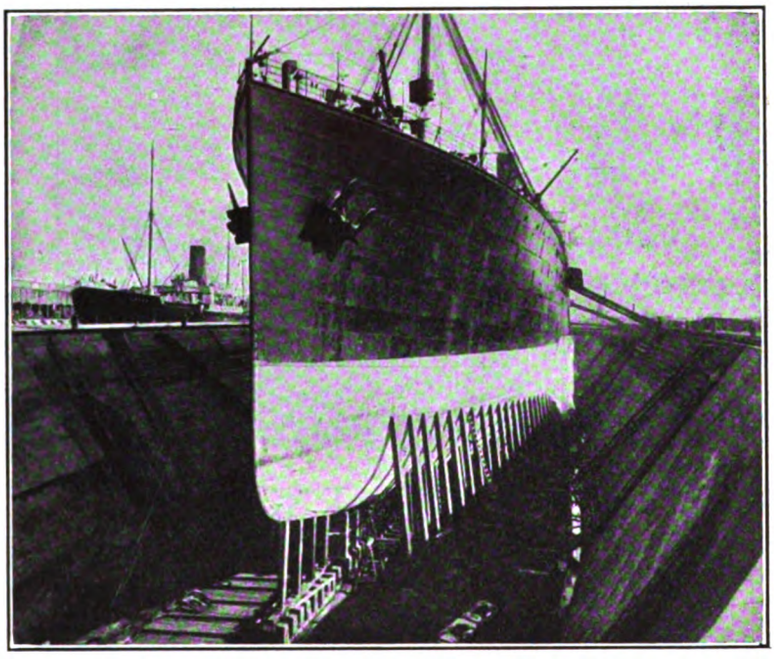
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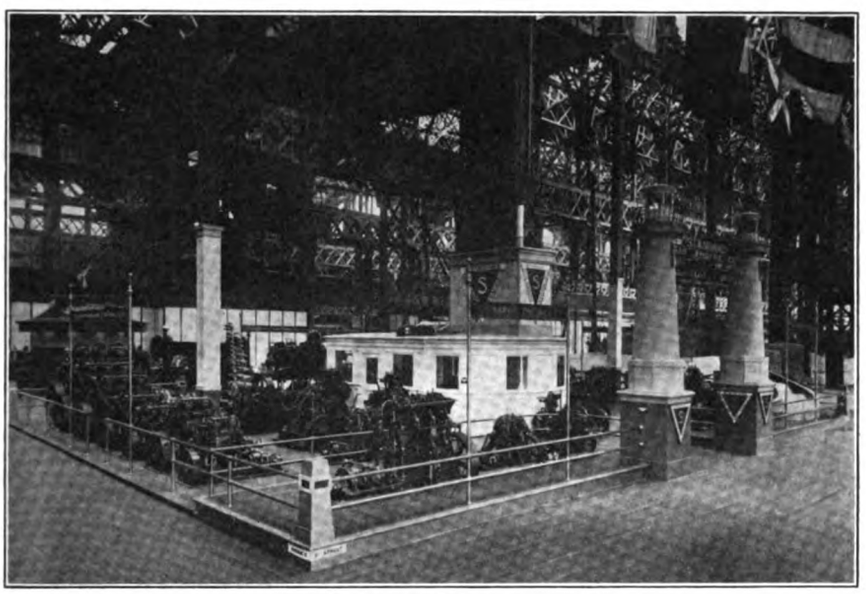
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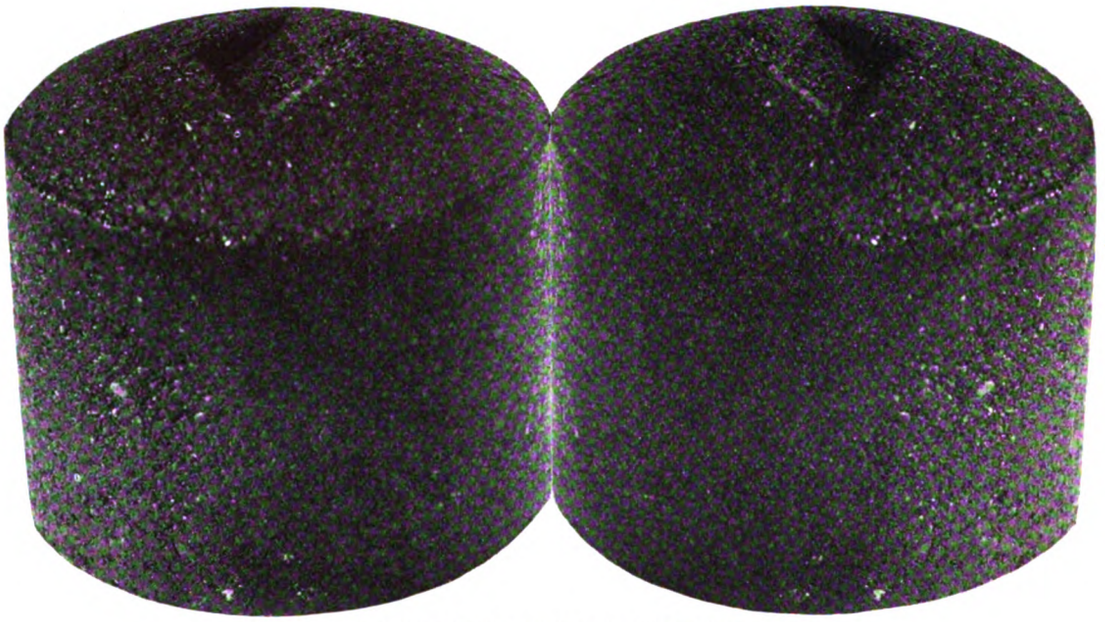
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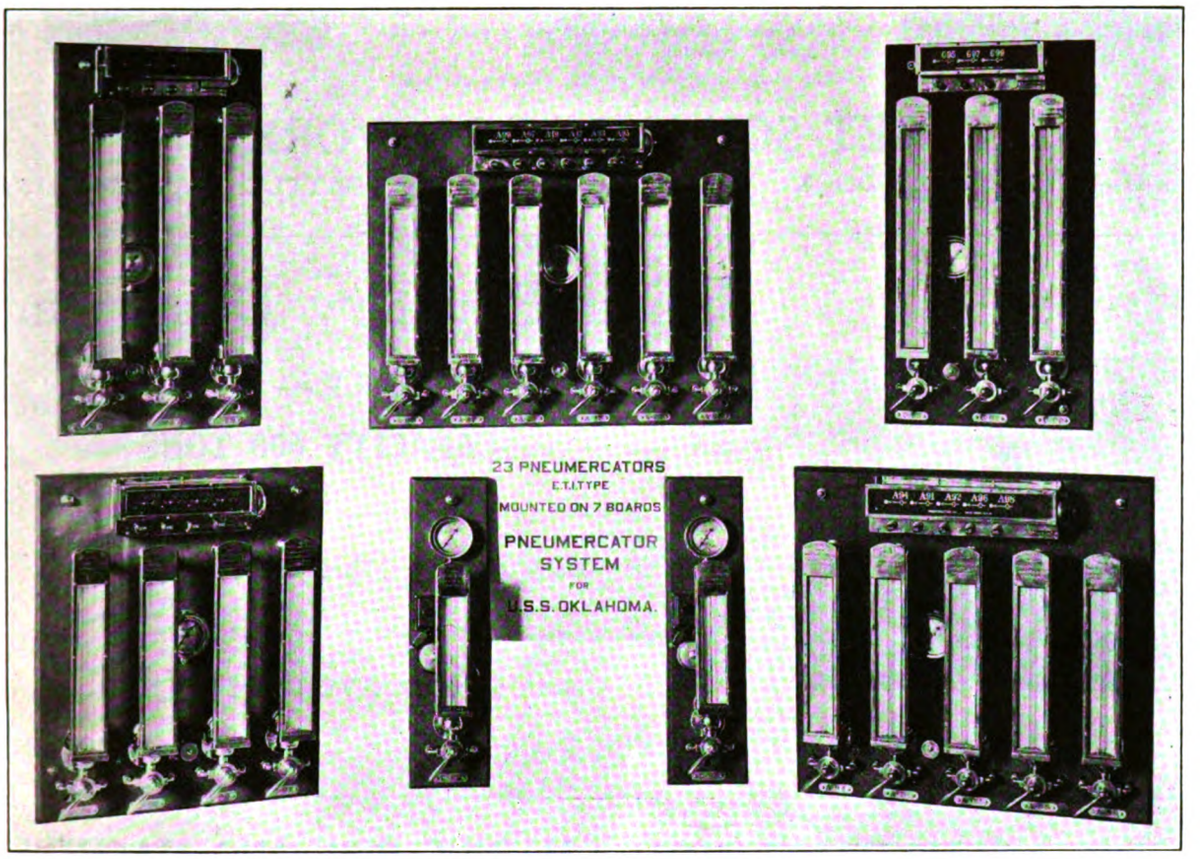
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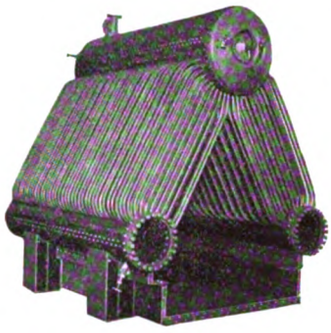
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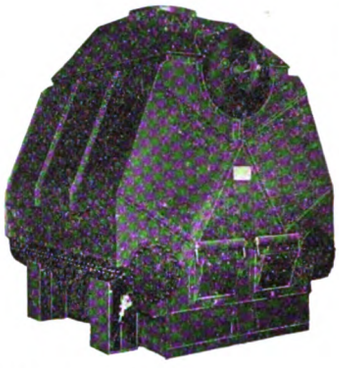
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SCOTT PATENT WATER TUBE BOILER



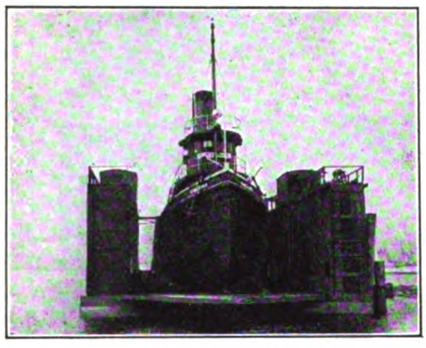
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Light, durable and compact.
Will stand most excessive forcing.
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Casing easily removable and every part of the boiler accessible.
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Works—KING STREET DOCK SEATTLE, WASHINGTON

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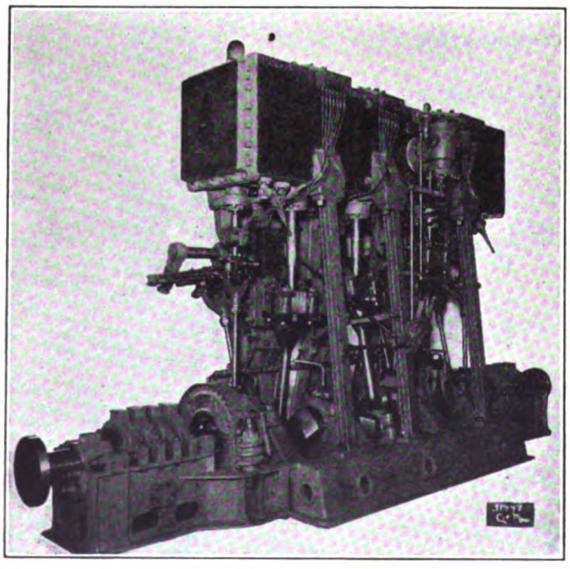
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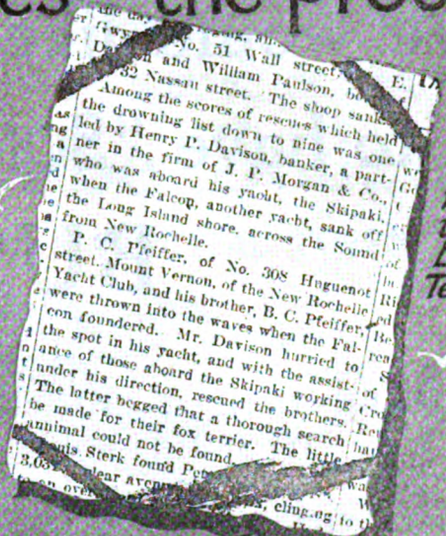
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Stronger than the gale—
COLUMBIAN PURE MANILA
Here's the proof—





from the N.Y. Evening Telegram.

What the owner of the Falcon thinks.

taken home.

In conlusion, I want to say that this experience has thoroughly demonstrated to my entire satisfaction that my choice of "Columbian" Rope proved eminently satisfactory and thoroughly established to my mind the dependable quality of "Columbian" Rope, which stood the most severe service test possible without the slightest sign of failing, as every halyard and sheet was standing on the "Falcon" when she went down as good as when they were first reeved, having gone through a gale that uprooted trees, tore roofs off of houses and reported to have blown at the rate of from 80 to 90 miles an hour, with each sheet and halyard doing its full duty all the time, as we carried full sail all through the storm and driving her for all she was worth so much so that we must have nearly ripped the bottom out of the "Falcon" but there was no sign of damage above deck to either rigging, sails or hull and when we saw what the storm was going to be, thought that the worst we could do was to blow the sails away or carry out the masts, but that is just where we were fooled.

Now to give you the benefit of my costly experience, all I can do is to recommend when you order or buy rope is to specify "Columbian" quality and don't forget the snap hook for the painter.

We now have a new boat and it is needless to say she will be "Columbian" rigged. As the old saying goes - "It is an ill wind that blows nobody good."

Yours very truly,

Columbian

Butler O. Pfeiffer

COLUMBIAN ROPE COMPANY
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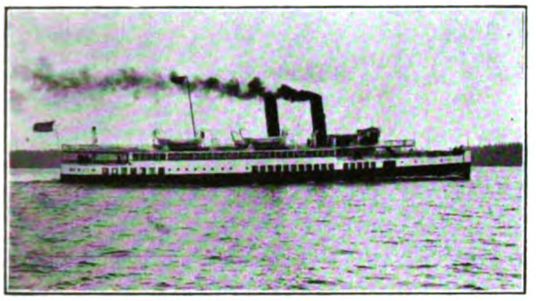
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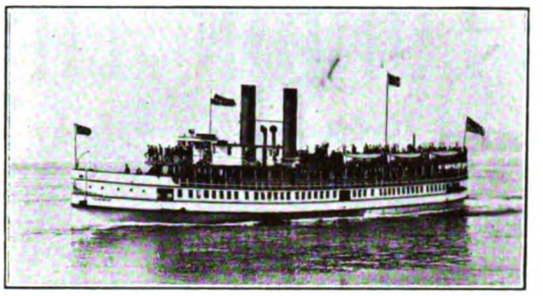
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S. S. "Tacoma"—Speed 21 miles
2 Boilers—3680 I.H.P.



S. S. "H. B. Kennedy"—Speed 20 miles
2 Boilers—2400 I.H.P.

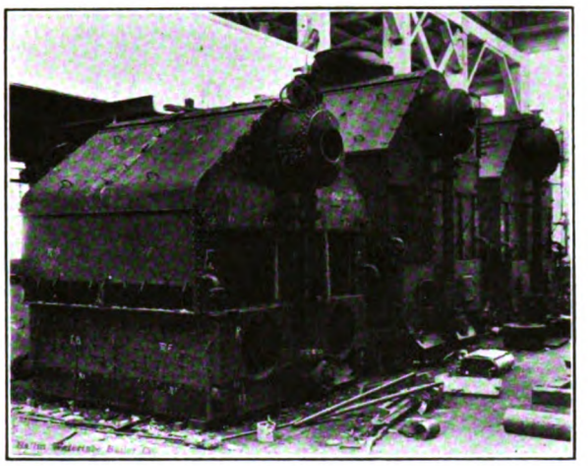
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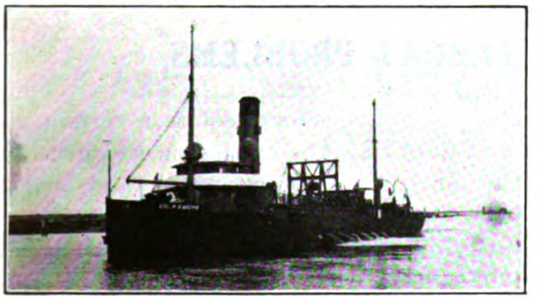


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BALLIN BOILERS have a large *Combustion Chamber;* all Engineers know its importance.
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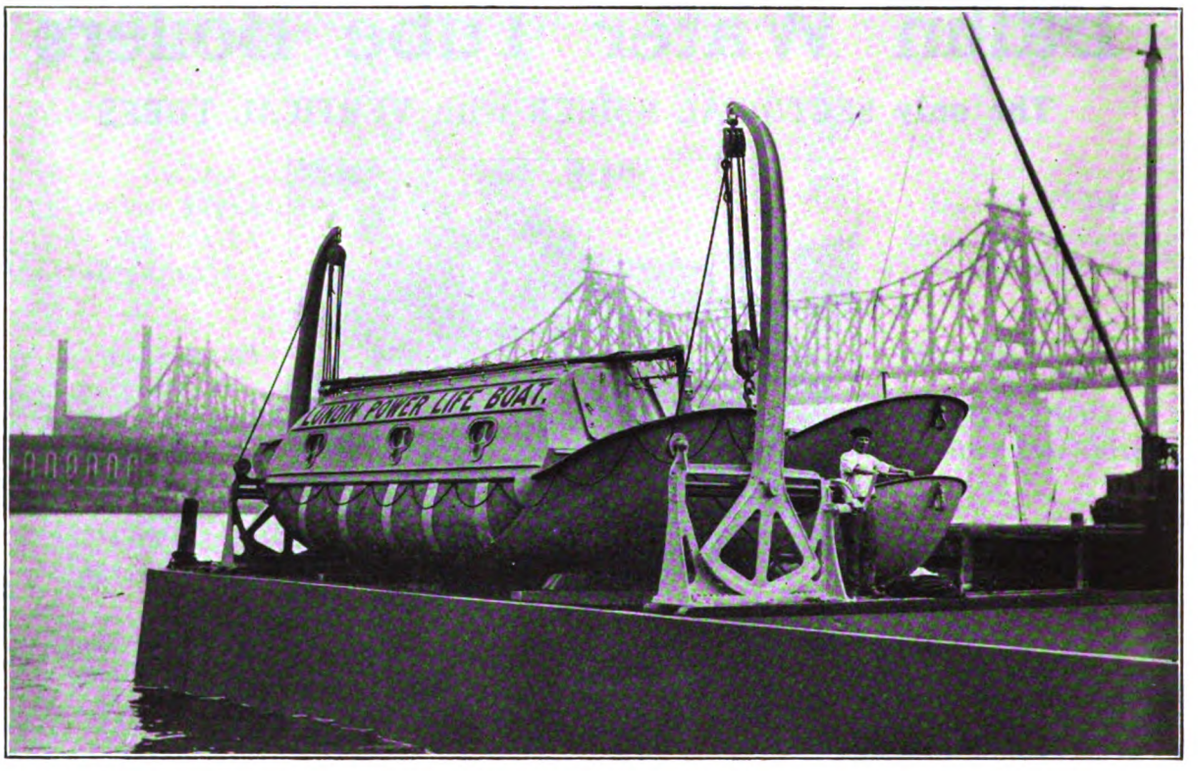
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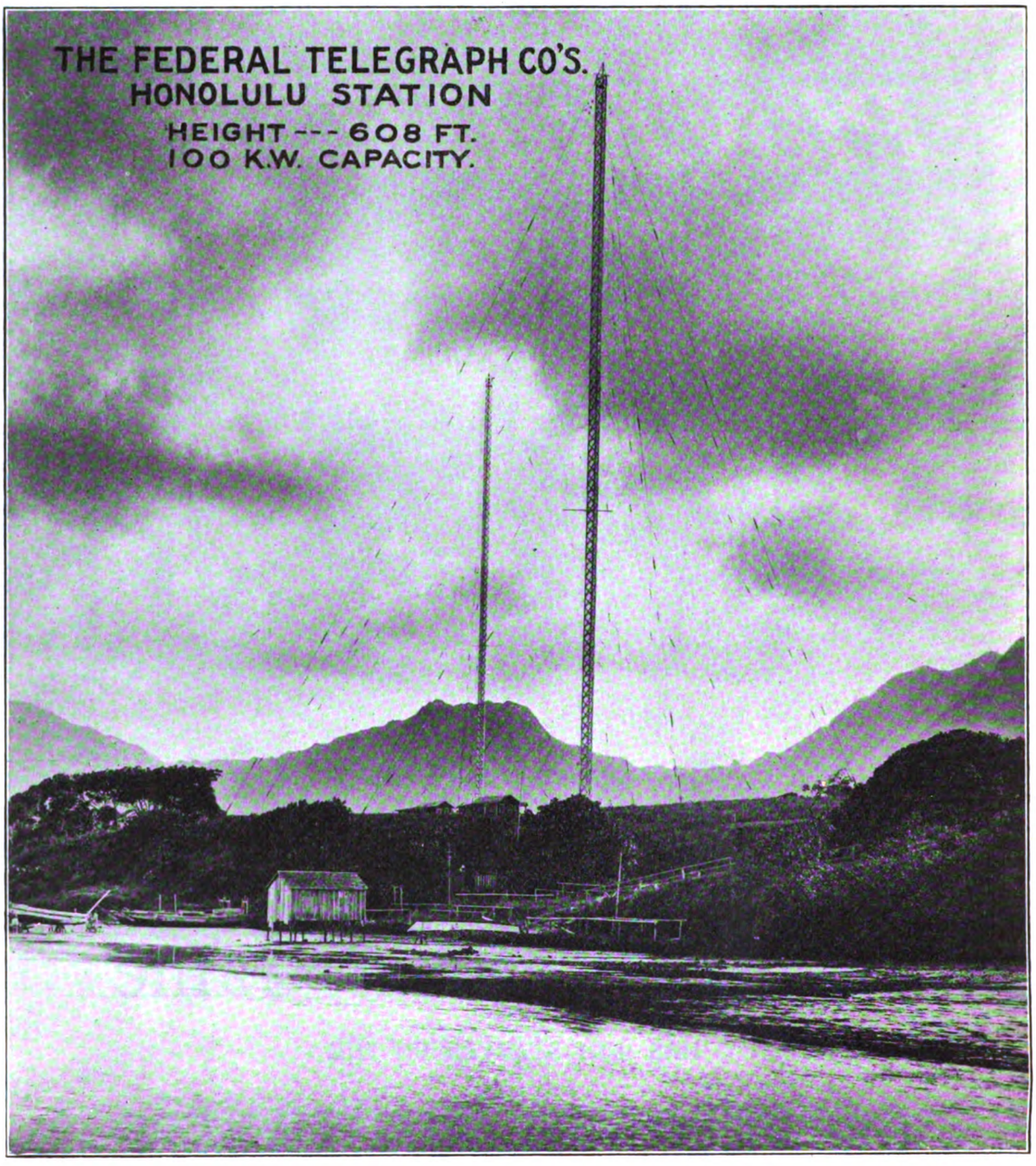
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PACIFIC MARINE REVIEW

LARGEST SHIPPING PAPER PUBLISHED IN THE UNITED STATES.

VOL. XII, NO. 5. SAN FRANCISCO MAY, 1915.

Our New Construction Number

Six months ago the shipyards in the United States were facing a gloomy and well-nigh hopeless outlook. The amount of work on hand had dropped alarmingly and there was nothing in sight for the future. Today, however, these same yards are running full blast and there is every indication that the present boom will continue for several years. Never before in the history of the world has the demand for new tonnage been so insistent. The Pacific Marine Review had been hopefully waiting for these new conditions to arise, and as soon as the shipbuilding establishments in the eastern section of our country were in full swing and there was a promise of this activity spreading to the Pacific Coast, we felt that we should do our part towards furthering a movement that might be best described by the phrase "Build her now." Ocean freight rates are high and there is no reason to believe that they will drop below their present level for years to come. Much discussion has taken place as to just what the relative costs would be in building a vessel in this country and abroad. A definite answer on this question has never been reached owing to the wide variation in cost with class and also to the admitted fact that the American-built freighter is a far finer, if not better, article than her foreign-built competitor. War conditions in Europe have seriously affected the cost of tonnage production on the other side of the pond. Wages have advanced materially and structural steel has risen 50% in price since the opening of hostilities. Taken in conjunction with the delays in turning out merchant work, due to the pressure of warring governments for naval supplies, the wage and material increases have advanced the cost of ship construction in Great Britain and on the Continent until the figures come closer to American costs than they have for the past fifty years. This condition would have probably resulted in a considerable demand on American facilities by English owners, but the American yards can not now accept any very extensive orders for anything like quick delivery. The American-built ship costs more than the ship of any other maritime nation and probably always will, but at the present time the difference in cost while considerable is not prohibitive. Now is the time to build ships. There is good business waiting for them and good profits to be earned.

In preparing the following pages, which may serve to give a faint idea of the importance and extent of the shipbuilding industry in the United States today, we have received the hearty support and cooperation of the management of the various shipyards. Pictures and descriptive matter have been supplied us freely and the Pacific Marine Review is pleased to take this opportunity of acknowledging these favors. We confidently feel that the shipbuilder and the numerous industries which receive at least a part of their support through shipbuilding are destined to experience splendid business conditions during the next few years. While it is true that our Government has passed a Seamen's Act, which will make it possible to throttle shipping wherever seamen's, waiters', or firemen's unions are strongly entrenched, there is a growing feeling that the Seamen's Act will be materially modified at the next session of Congress and that our national legislators will soon realize that constructive measures must take the place of class legislation and corporation baiting if we are to enter into any permanent expansion as ocean traders.

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A busy scene at the Union Iron Works' wharves

The Union Iron Works Company

THE Union Iron Works Co. was founded in 1849 as a modest blacksmith shop, but as mining activities increased on the Pacific Coast it rapidly grew into one of the largest and most important industries of its kind west of Chicago. During the early days the best in mining machinery for the precious metals was developed on the Pacific Coast and the world soon looked to California not only for its ideas but frequently placed large orders in San Francisco for this class of work. The Union Iron Works as it was then called, always enjoyed more than its full share in the development and manufacture of mining machinery and during its career filled many large orders for the Orient, Mexico, South America, and Africa besides building most of the heavy machinery and pumping plants for the famous Comstock Mines.

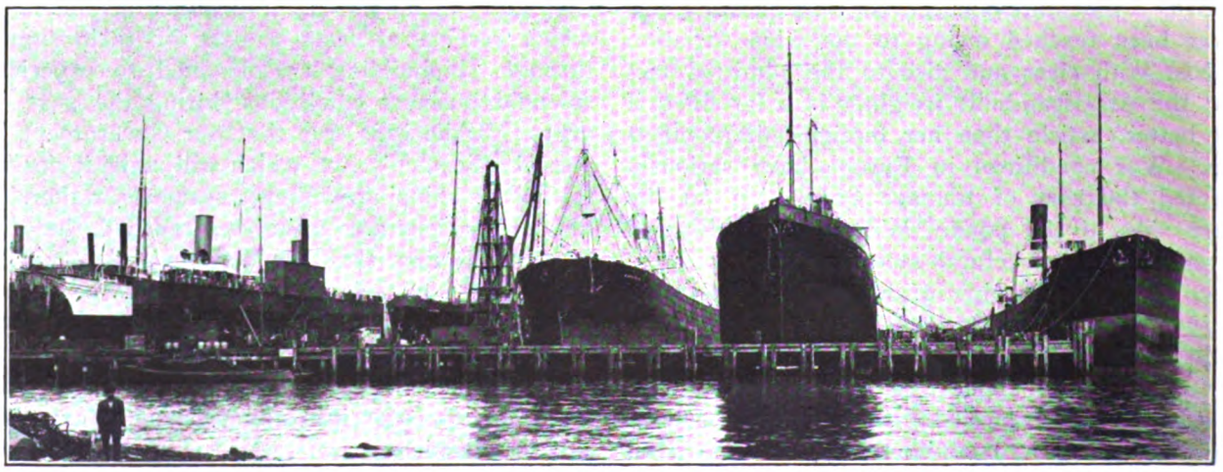
As transportation facilities increased and Eastern markets became more and more accessible it was realized that the Pacific Coast could not expect to permanently rertain its supremacy in the manufacture of mining machinery. On this account it was decided to undertake steel ship building. With this end in view the present location at the Potrero on the Bay of San Francisco and about two miles from the heart of the City was acquired in 1882 and the construction of a modern shipbuilding plant commenced in 1883.

This undertaking so remote from the source of materials was not only considered by many a great hazard but required unusual courage and enterprise on the part of the men behind the movement. The success of the venture however, more than proved the wisdom and foresight of the organizers.

In September, 1904, the Union Iron Works Co. became a subsidiary of the Bethlehem Co., controlled by Mr. Schwab, when new life was instilled into the institution insuring continued expansion and prosperity.

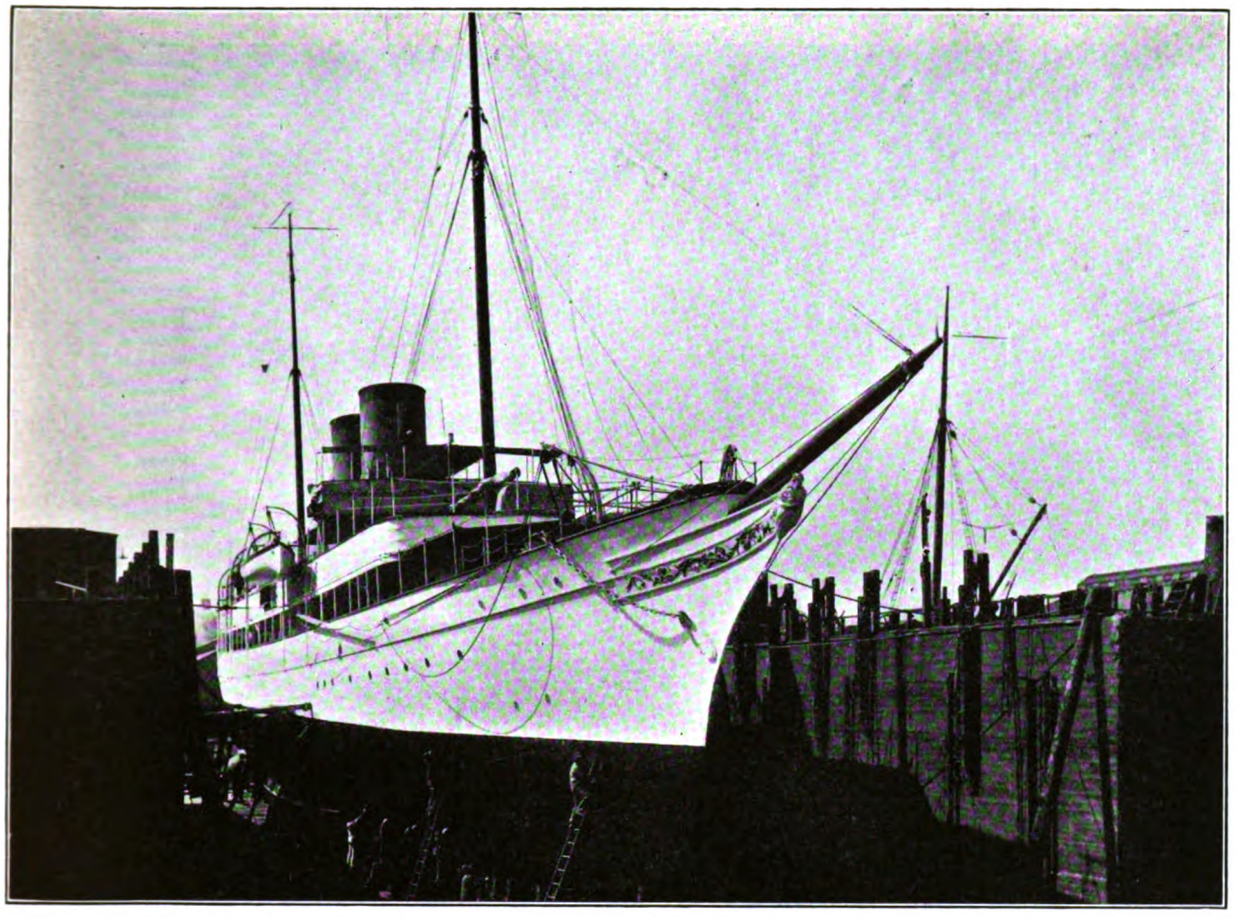
The Hydraulic Lifting Dry Dock which had done excellent service for twenty years was destroyed by the earthquake in 1906 and ultimately led to the purchase of the property of the San Francisco Dry Dock Co. in 1909, consisting of three floating docks and two graving docks at Hunter's Point. Two of the floating docks were moved to the Potrero Works and all of the docks operated under the name of the Union Iron Works Dry Dock Co.

Since acquiring the Union Iron Works Company, Mr. Schwab has taken a great personal interest in the rehabilitation of the plant and under the leadership of Mr. John A. McGregor, president of the company, has encouraged improvements only of the most substantial and permanent character.

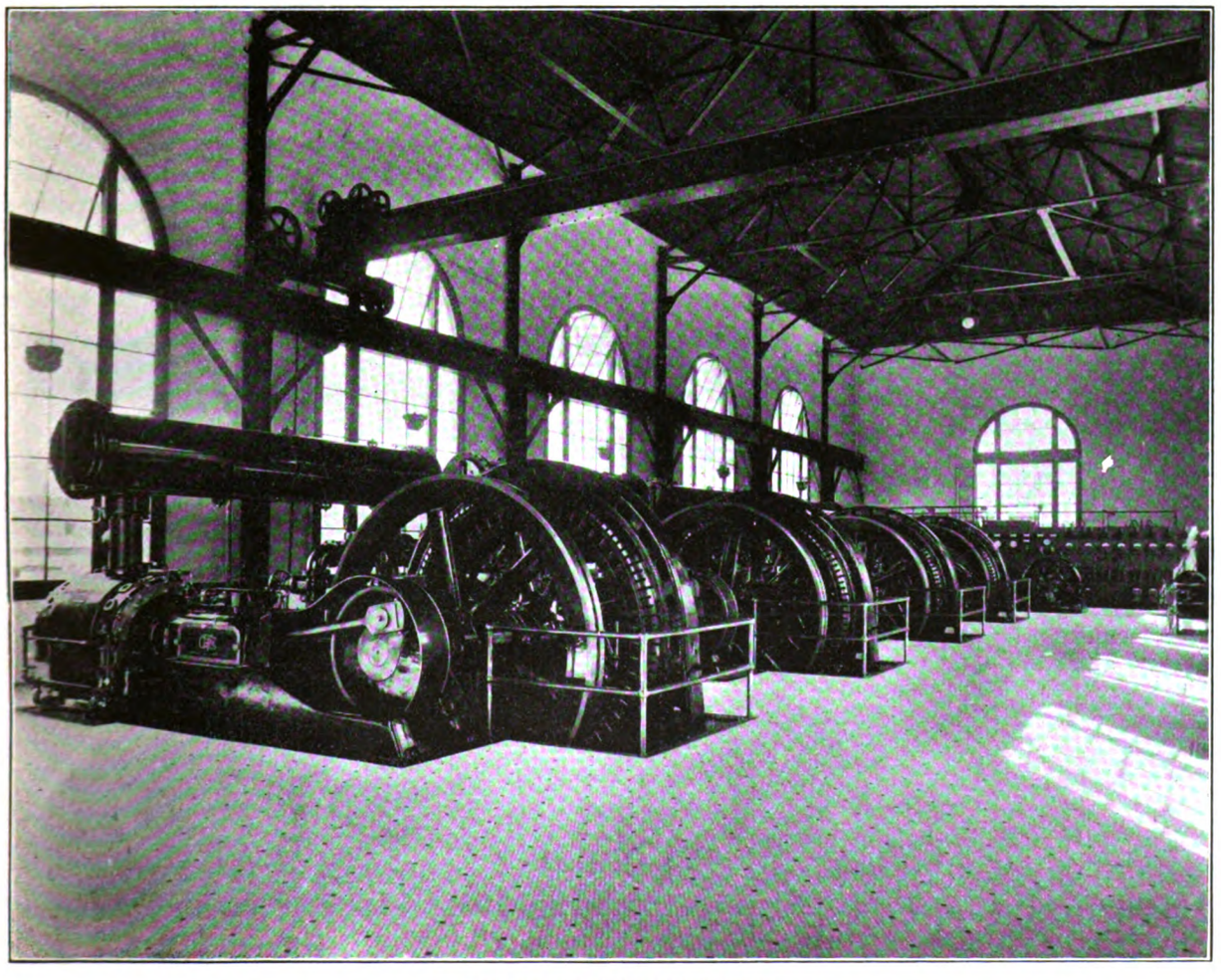


The Union Iron Works fitting-out wharves from the shore side

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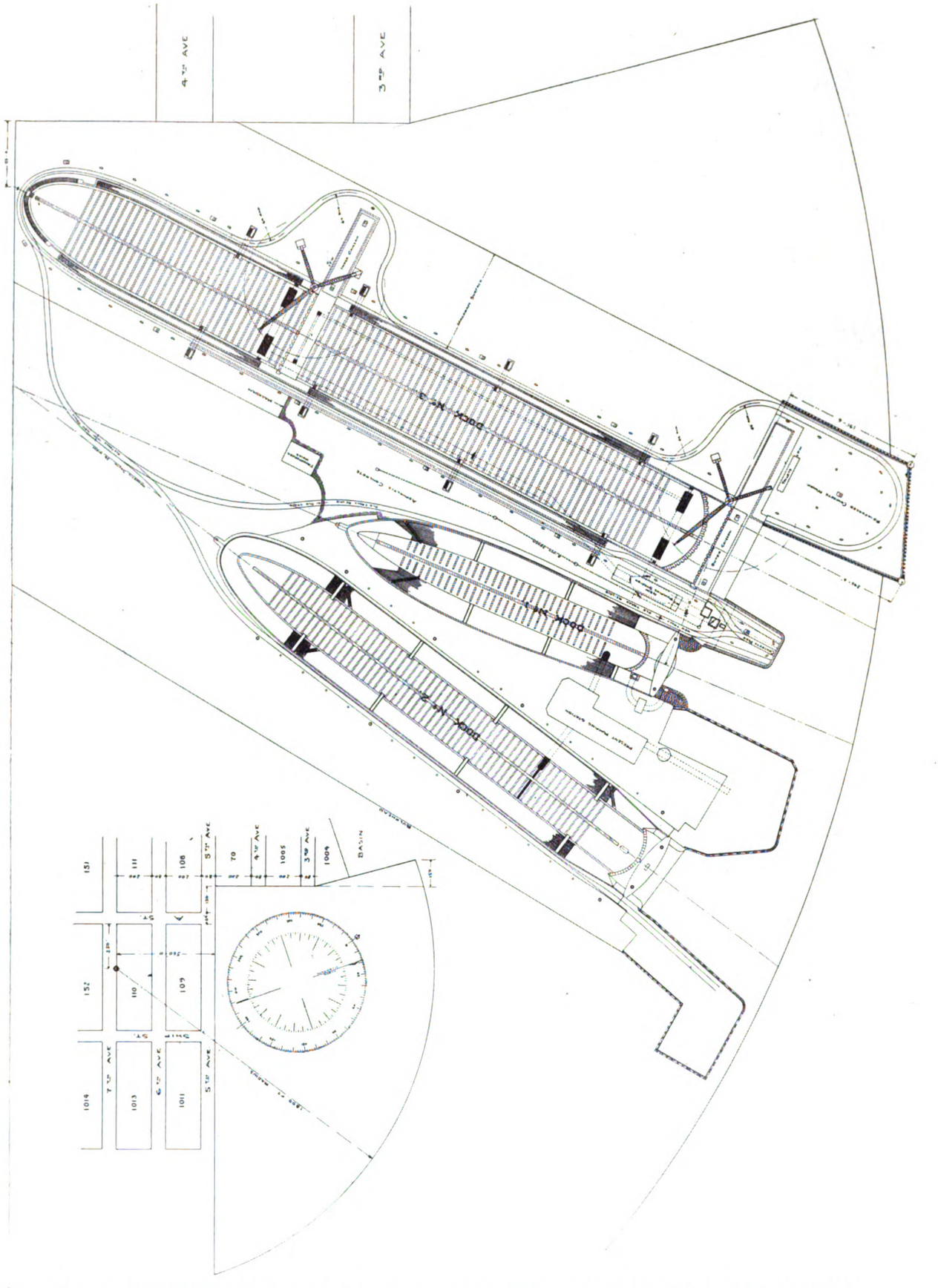


Yacht "Noma" in dry dock at the Union Iron Works



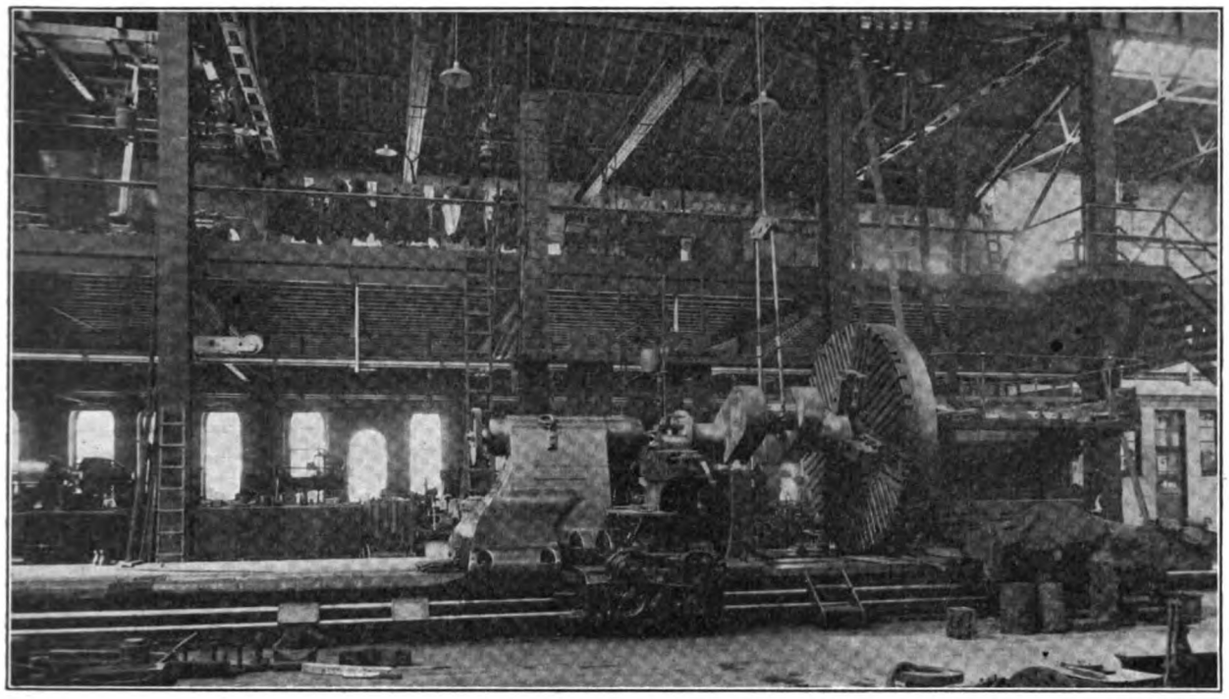
The interior of the power house

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Plan of the Hunters Point Dry Dock plant, showing the new dock, work on which will shortly be commenced

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Large lathe in machine shop

The steam power plant has been demolished and the whole institution electrolized with individual motors fitted on each tool and in addition to thousands of dollars spent on new high speed tools, the following premanent improvements have been completed at the Potrero Works:

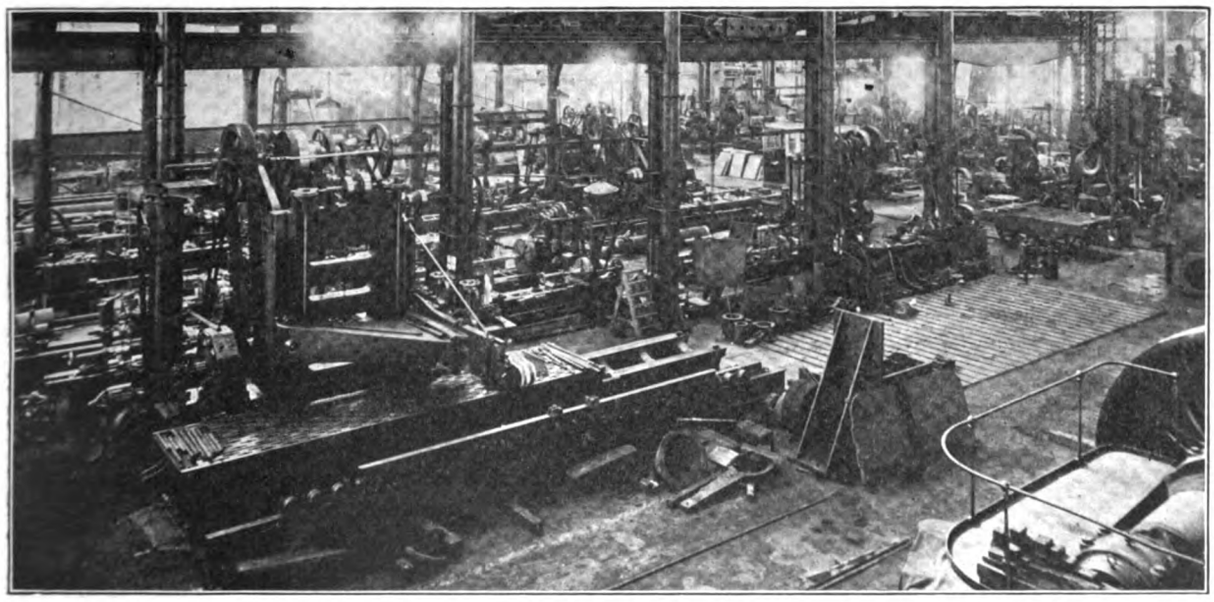
(a) Reinforced concrete electric power station built in Mission style, supplying power for all of the tools, shops, pumping stations, floating dry docks and cranes, including an entire new wiring system and underground system of conduits and piping for compressed air, etc.

(b) New steel building for punch shop at upper end of building slips. This building has two bays running longitudinally each with electric cranes traveling full length and hand traveling cranes at each side of each bay serving the tools, one crane to each tool where required to handle material. The tracks have two rails and run the full length of the bays and therefore can accommodate as many hand cranes as there are tools.

There is also a twenty-ton traveling crane over the large hydraulic presses. The building also contains screve boards, furnaces, slabs, angle smith shop, yard store room and tool room on the ground floor.

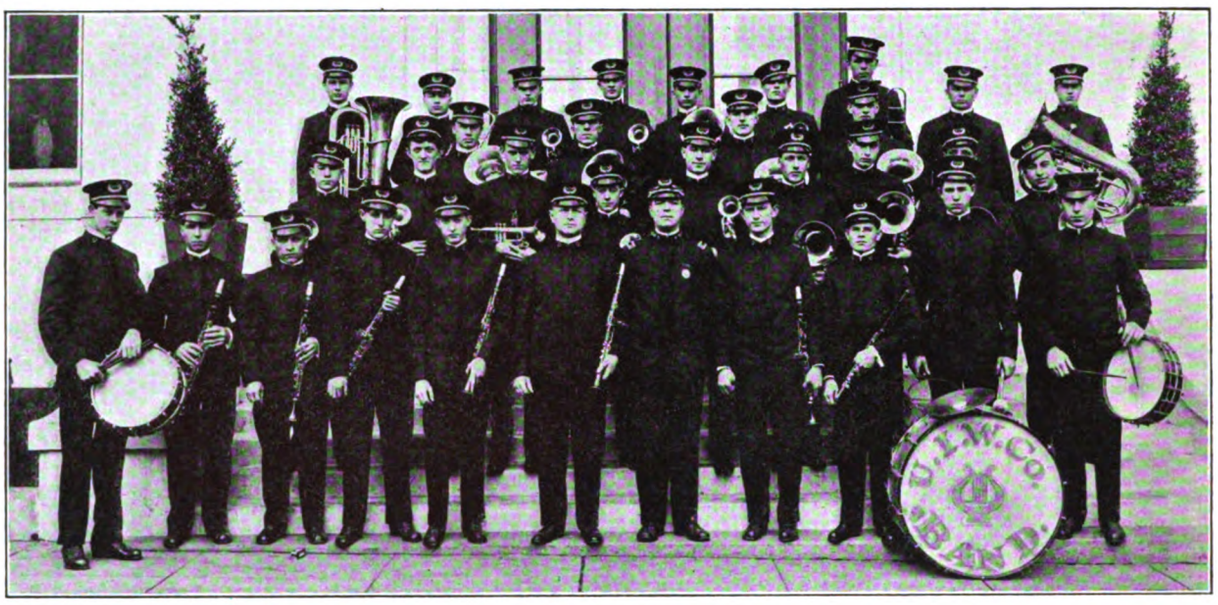
The mold loft is on the second floor together with offices for inspectors.

(c) New steel blacksmith shop containing two electric traveling cranes, steam hammers, furnaces



A big planer at work

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The Union Iron Works' band

and forges and reinforced concrete room for boilers operating the steam hammers which are the only tools using steam in the works. All furnaces and forges are served by a low pressure oil-burning system and not a pound of coal has been used in the shop since its installation.

(d) New steel sawmill and joiner shop with exhaust system carrying shavings to boilers in blacksmith shop.

(e) New steel rigging loft.

(f) New reinforced concrete building containing pipe fitters' shop, coppersmith shop, sheet iron shop, marine machinists' shop, and marine electric shop.

(g) New 120-ton sheer legs.

(h) New reenforced concrete bay joining main machine shop bay and erecting shop so that the traveling cranes can pass from one to the other.

(i) There is also at the present time under construction, four new building slips replacing old wooden slips. The old slips were of wood wharf construction with wood overhead framing for the traveling cranes. In the new slips the weight of the ships will be carried on the original piles with new caps and stringers where required and made flush with the surface with rock filling between and below in lieu of the old wood wharf surface.

A new plan has been devised for the overhead cranes consisting of steel viaducts about 60 feet high running the full length of the slips. Each viaduct will have a 30-ton electric locomotive crane traveling on a 10-foot gage track with booms long enough to reach 10 feet past the center of vessels under construction.

(j) New tool room and elaborate lavatories, showers, etc., have been built in connection with the machine shops.

(k) Plans have been completed and material ordered for a new brass foundry and an extension to the iron foundry that will practically double its capacity.

(l) Plans and specifications have also been completed for an extension to the new sawmill and joiner shop that will more than double the floor space.

(m) The tracks in the yard have been entirely rearranged so that they run parallel with the buildings in lieu of running diagonally, thereby economizing much valuable space.

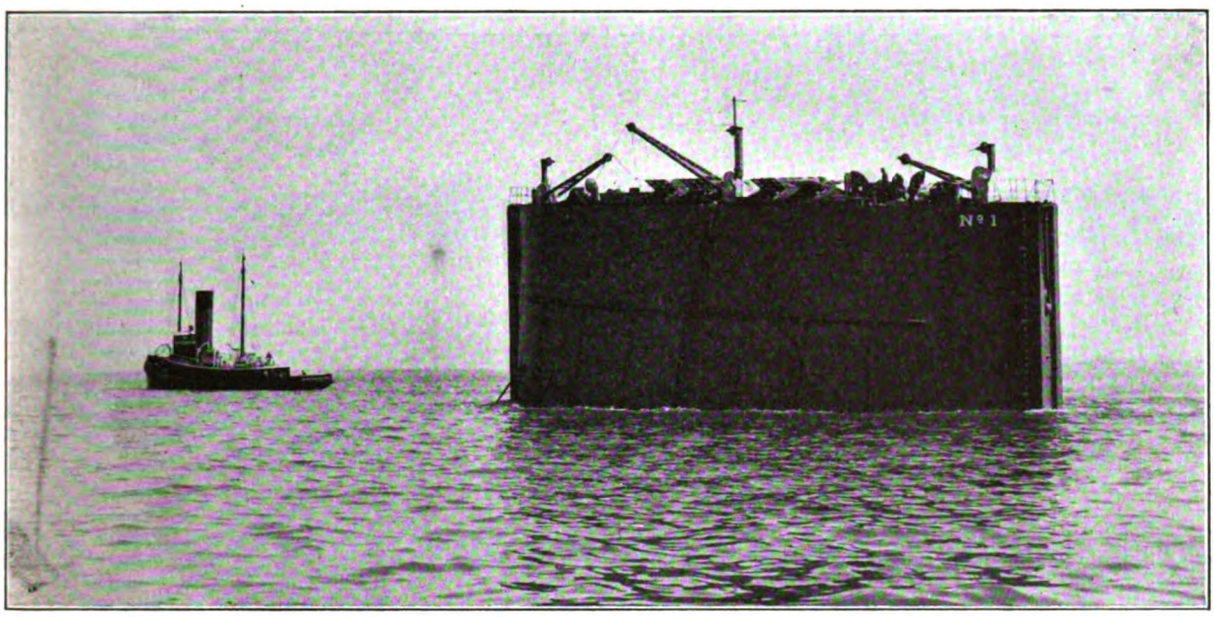
A new cantilever crane has been installed in connection with these tracks. The crane has a space of 160′ 0″ and travels 800 feet, covering practically the entire storage space in the yard. Material is received both by rail and water with equal facility and with a minimum of handling.

The main works at the Potrero cover 38.19 acres and the building slips, piers and docks are so arranged that there is not less than one mile of water front for launching and mooring vessels. While this is a liberal amount of water front for a 38-acre tract it has frequently been taxed to its utmost capacity. Not less than 26 vessels have been moored at the works at one time, either receiving the finishing touches or undergoing repairs.

There is only one street passing through the property dividing the works into the south works and north works. The South works contain the pattern shop, brass and iron foundries, machine shop, erecting shop and bolt and rivet shop.

The North works contain seven building slips, two floating dry docks, numerous mooring berths, 120-ton sheer legs, punch shop, mold loft, rigging loft, paint shop, sawmill and joiner shop, pipe shop, electric shop, copper shop, sheet metal shop, marine machinists' shop, boiler shop, blacksmith shop, power plant, storeroom, storage space for

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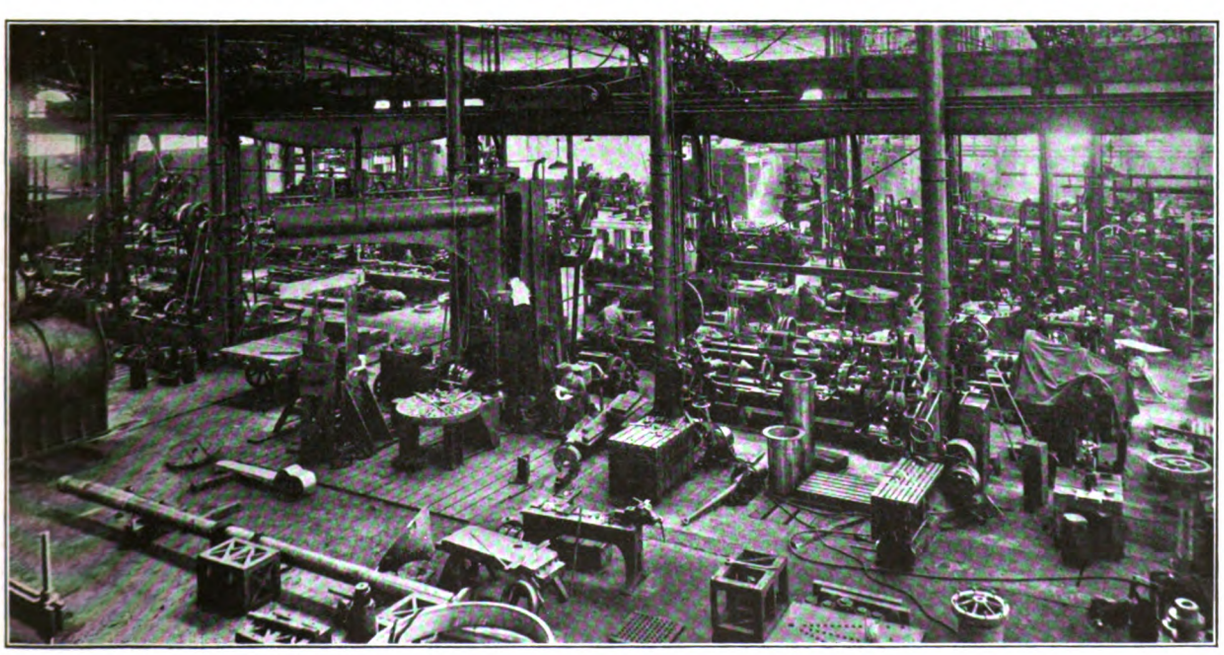
Panama Canal caisson, an interesting structure built at the Union Iron Works

structural material, billets, bloom, lumber, etc., and main office building.

One hundred and twenty vessels have been built by the Union Iron Works Co., including passenger boats for ocean, bay and river service, cargo steamers, tankers, yachts, tugs, ferryboats, battleship, armored cruisers, cruisers, monitors, gunboats, torpedo boat destroyers, torpedo boats and submarines.

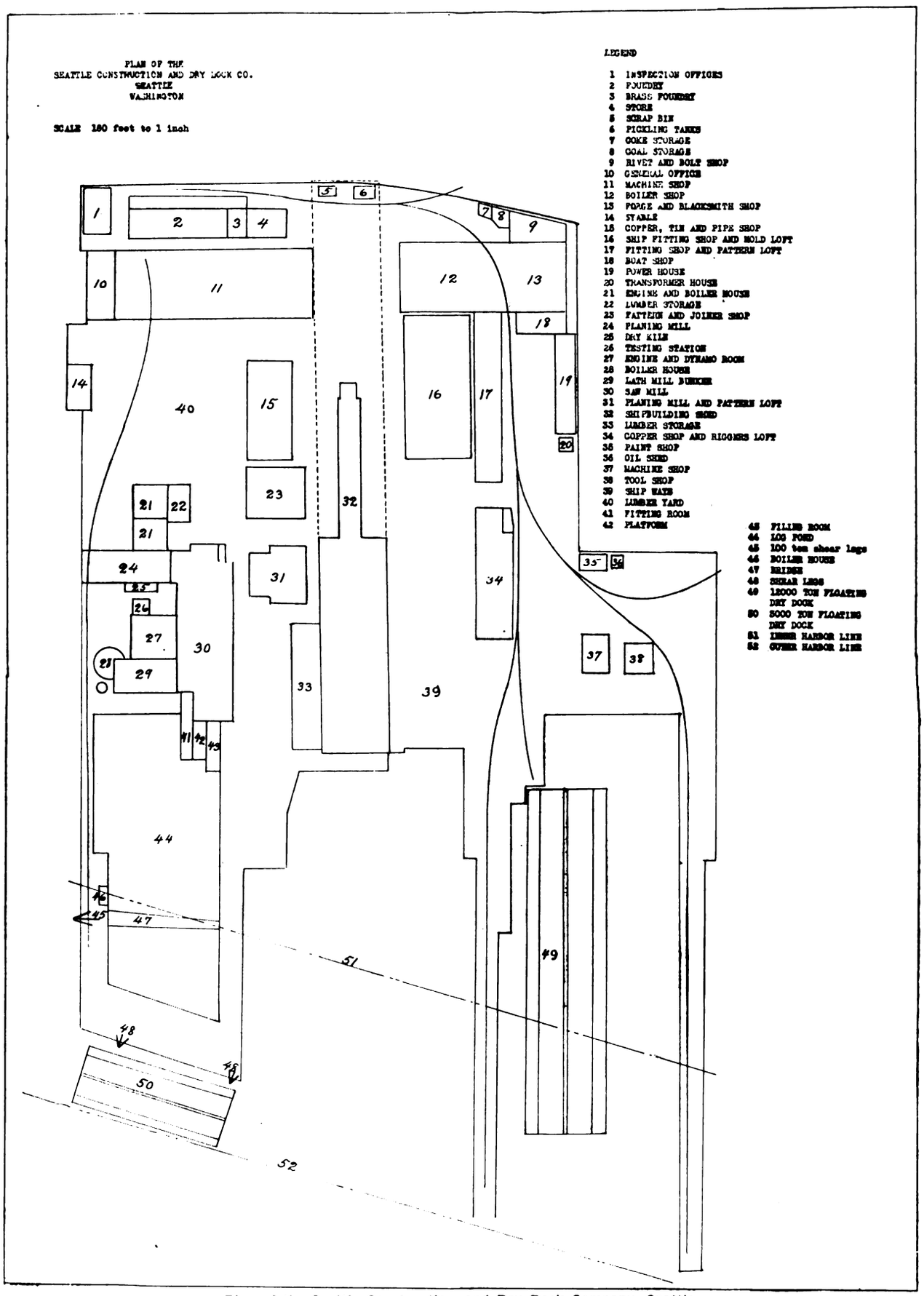
The property at Hunters Point faces deep water on the Bay of San Francisco about one and one-half miles from the Potrero Works and contains 45.6 acres. It is here that the two graving docks, one 750 feet long and the other 483 feet long, mentioned above, are located. This is also the site selected for the new proposed graving dock, the construction of which will be commenced at an early date. The new dock will be 1096 feet long by 120 feet wide and have a depth of water of 40 feet over the sill and be capable of docking the largest vessel that can be passed through the locks of the Panama Canal.

The Secretary of the Navy has approved the plans and specifications for the new dry dock and guarantees the company $50,000 worth of docking annually for six years in consideration that the company builds the dock and allows the Navy Department prior right for use of same during the six-year period. Hunters Point has long been regarded as one of the most ideal sites for a dry dock on account of the deep water and favorable rock formation.



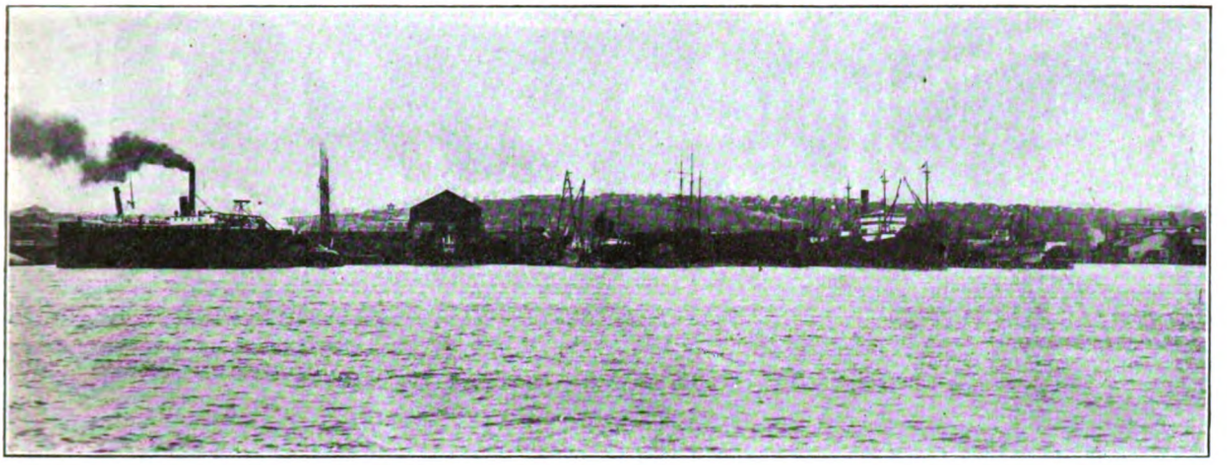
One end of the machine shop, Union Iron Works

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Plan of the Seattle Construction and Dry Dock Company, Seattle

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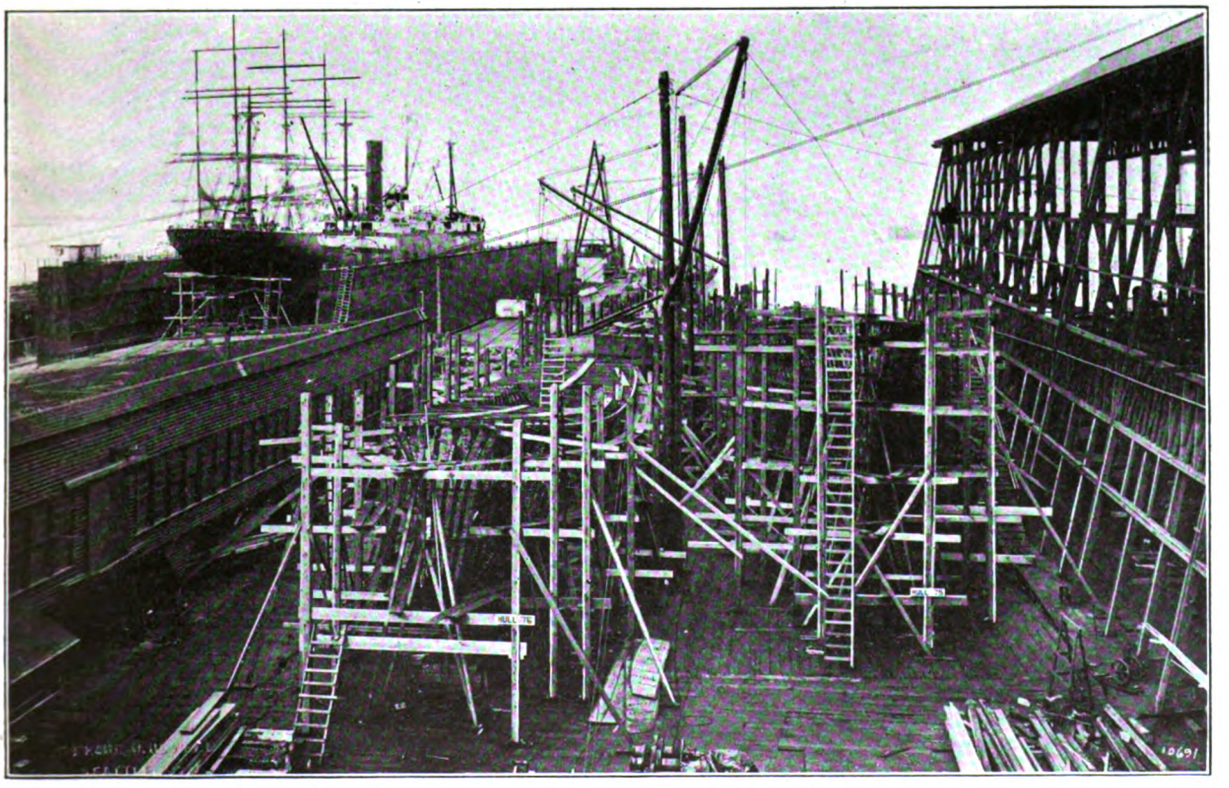


General view of the water front of the Seattle yard

The Seattle Construction and Dry Dock Company

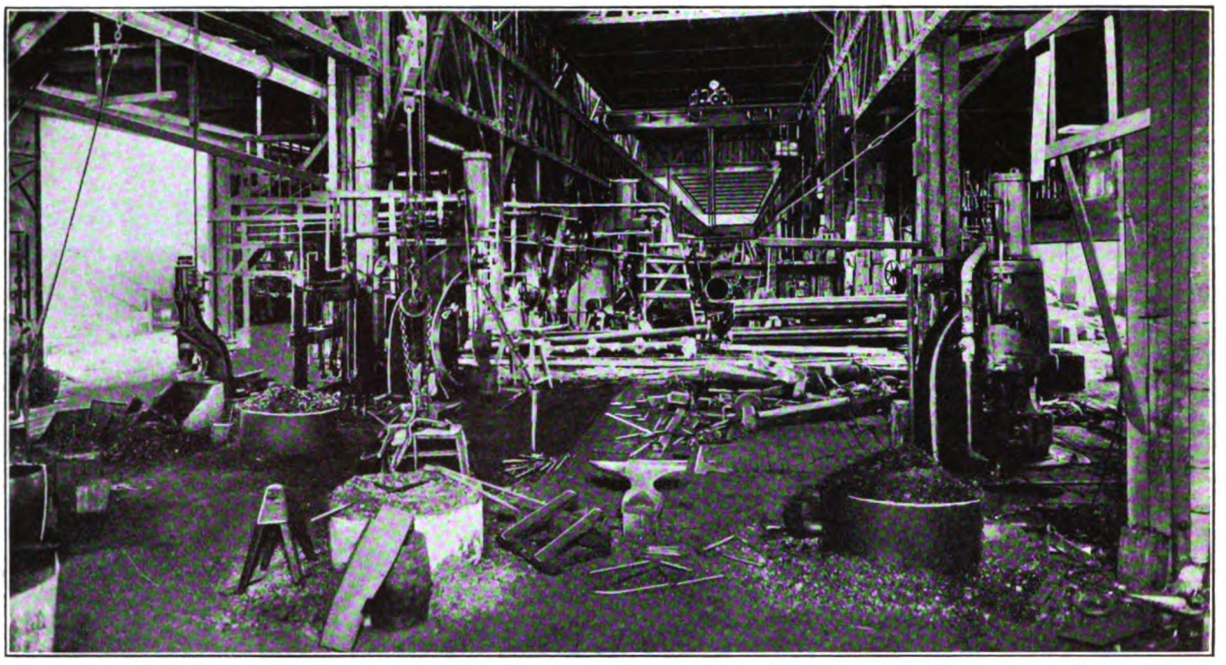
THE plant of the Seattle Construction and Dry Dock Company is situated practically in the heart of Seattle's water front. Inaugurated twenty-five years ago, this was the only really great shipbuilding and repair establishment serving the needs of Puget Sound and British Columbian shipping for many years and, while several very large plants are now under course of construction in Canadian territory, the Seattle firm still maintains a good lead in point of equipment and ability to handle large work. Puget Sound is very well supplied, also, with smaller shipbuilding and repairing establishments and a very large number of small craft is credited to the new construction records of this section of our country every year.

The yards of the Seattle Construction and Dry Dock Company cover an area of twenty-seven acres and are directly served by five railroads, the Oregon-Washington Railroad and Navigation Company, the Northern Pacific, the Great Northern, the Chicago, Milwaukee and St. Paul and Puget Sound, and the Canadian Pacific Railway. These extensive railroad connections combined



General view of shipbuilding slips and floating dry dock

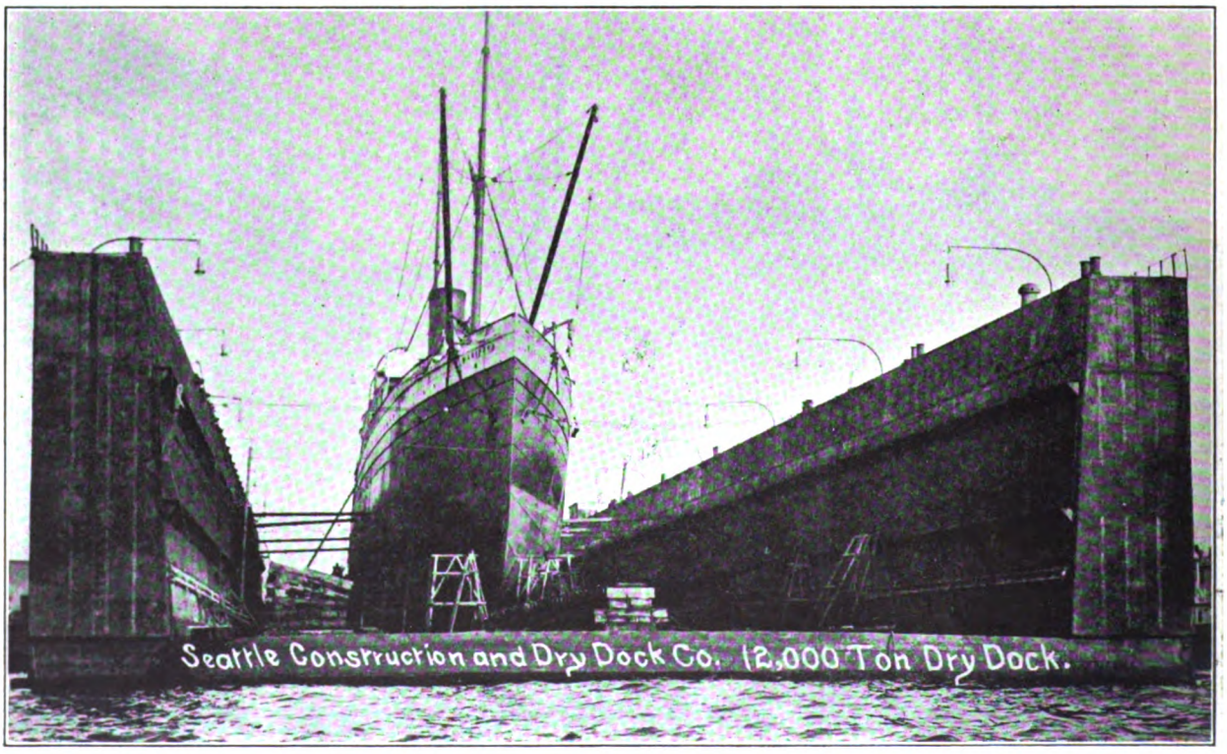
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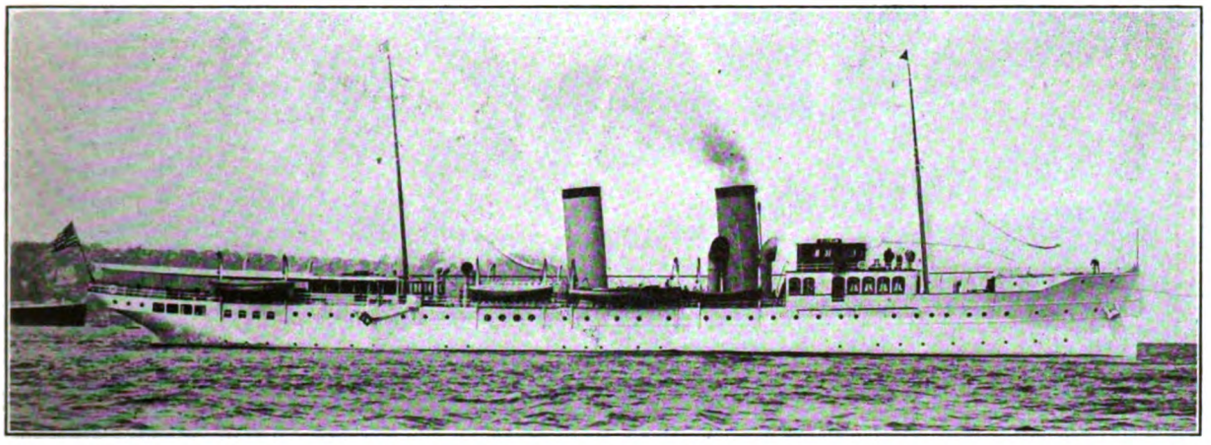
The forge shop of the Seattle Construction and Dry Dock Company

with a system of waterways covering a great section of the Northwest make Seattle a site peculiarly adapted to the fostering of a large shipbuilding and repair concern. During the past twenty-five years, the policy of the company has been highly progressive and its growth has been consistently steady. The equipment of metal working machinery and the labor-saving devices for handling materials have been kept fully abreast of the most modern practice. The great distance of the West Coast from the centers of steel production in the United States has placed upon this concern, as well as others in the West, certain conditions that have tended to make the plant self-sufficient. The work covers a much wider range than is usual in shipbuilding establishments and a greater variety of construction work is carried on than is usually undertaken in the shipyards of the older sections of our country. A Western yard often makes within its own confines many articles that the Eastern shipbuilder buys from some manufacturer.

In a general way, the plant of the Seattle Construction and Dry Dock Company consists of the



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C. D. Jackling's steam yacht "Cyprus," built at the Seattle Construction and Dry Dock Company's plant

following units, their relation to each other and their coordination being depicted on the accompanying plan: Administration building; an office building for the use of customers, their representatives and Government inspectors; pattern shop; joiner shop; foundry; machine shop; boiler shop; blacksmith and forge shop; bolt shop; pipe shop; galvanizing shop; steel construction shop; ship shed; ship ways; mold lofts; saw mill; planing mill; two large power plants; two shear legs of sixty and seventy-five tons capacity respectively, one of these being a floating unit; and two floating dry docks, one of 3000 and the other of 12,000 tons lifting capacity.

Floating Docks.

The large floating dry dock was constructed at the plant itself, being completed in February, 1913, since which date it has been extremely busy. The dock is of the Rennie type, being built up of six pontoons and having two steel walls. The lifting capacity is 12,000 tons, the length on keel blocks 468 feet and the clear width, inside the wall faces, 85 feet. It is the intention, in the near future, to add two pontoons to this structure which will bring the length over keel blocks up to about 600 feet and increase the lifting capacity to 18,000 tons. The smaller dock is of 3000 tons lifting capacity, and, being of a suitable size for smaller craft, has always been well occupied.

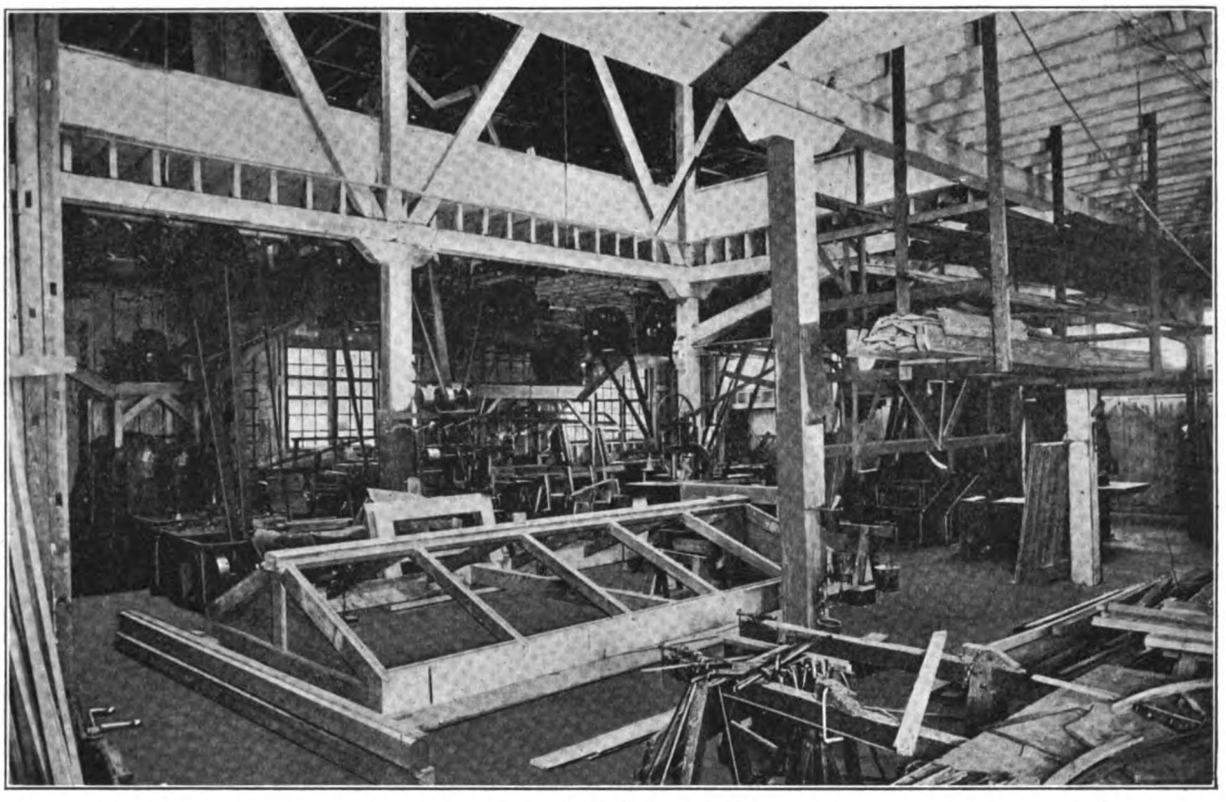
The Shops.

The illustrations herewith give but a partial indication of the extent and diversity of this plant. The picture of the machine shop, for example, shows a few of the large tools necessary in the heavy construction work that is done here and conveys an idea of the output calling for such



Machine shop, showing several heavy tools

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Corner in the large joiner shop

heavy equipment. The other illustrations shown include the foundry, where the castings, large and small, used by the plant are made; a corner in the copper pipe shop; a portion of the large joiner shop; and the forge shop with its heavy hammers, under which large shafting, rudder posts, stern frames and the like are forged from the billets.

As might well be expected in the Pacific Northwest, one of the most interesting features of this comprehensive plant is its saw mill. All the world sends to the Pacific Coast for spars. The wonderful timber of this region is nowhere equaled for this purpose. The great Douglas firs grow to an enormous size, standing straight and clear for more than 150 feet from the ground to the lowest limbs and from there on for another hundred feet or more.

The saw mill of the Seattle Construction and Dry Dock Company turns out about 6000 board feet of lumber per hour from great fir logs four feet or more square and over one hundred feet in length. Here, in conjunction with the planer mill and joiner shop, are finished the furnishings of hard and ornamental wood that go into the fitting up of passenger vessels. The power plant which furnishes power for the saw mill and throughout the yard is supplied by steam from a battery of boilers with specially constructed furnaces for burning sawdust and other waste products of the mill.

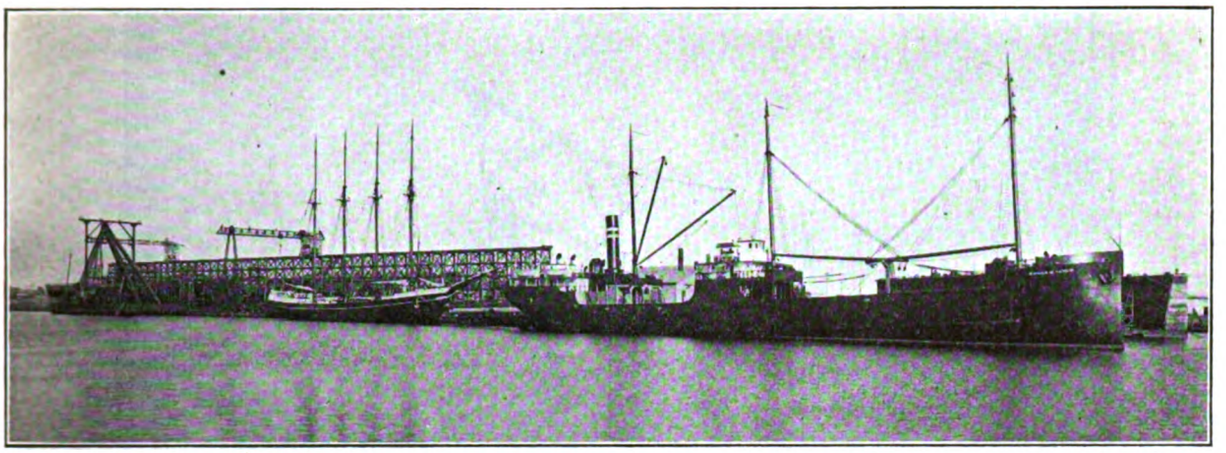
The Craig Shipbuilding Company

THE Craig Shipbuilding Company, the only steel shipbuilidng, repairing and docking plant in Southern California, is at Long Beach, on San Pedro Bay. The shipyard being adjacent to San Pedro, the port of the southern metropolis, Los Angeles, and being to all practical purposes an institution of that harbor, its splendid location and facilities for serving the shipping there are very apparent.

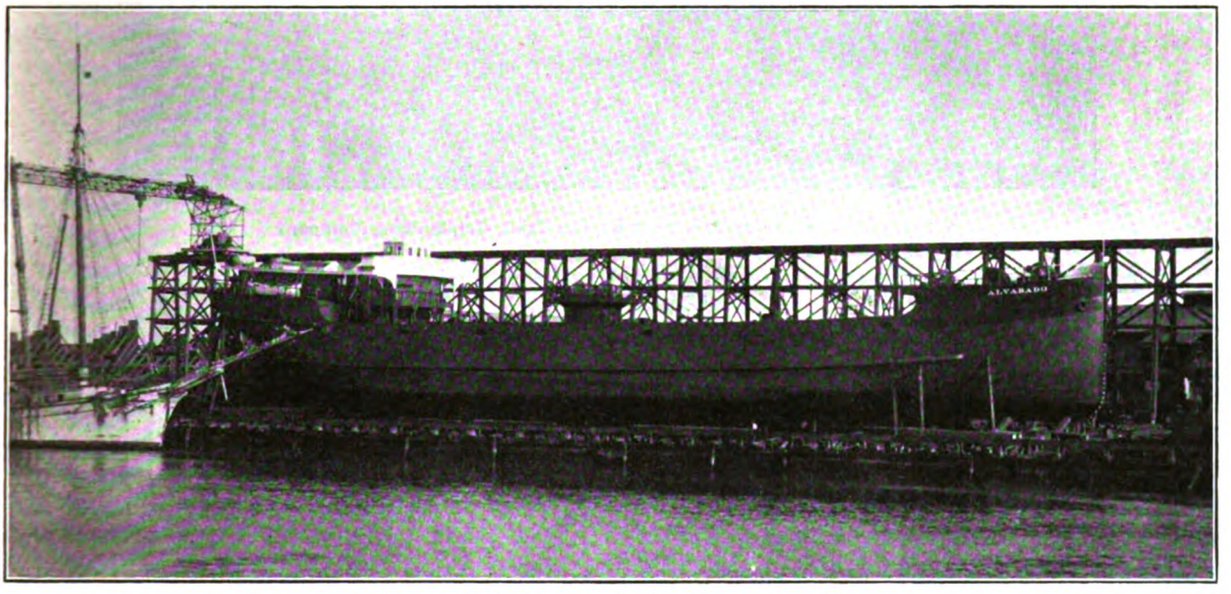
The Craig Shipbuilding Company was widely and favorably known during its long and successful career at Toledo, Ohio, and when its sale was consummated in 1906, Mr. John F. Craig was soon to bring the old firm name to a new field. His foresight in selecting the present site is proven through the enormous increase each year in the shipping business in its vicinity, both domestic and foreign.

Well worth mentioning is the very uniform climate of Long Beach, where ship construction and repairing can be carried on without the vexatious lay-offs for frequent rains, snow and cold weather that so often embarrass most of American shipyards.

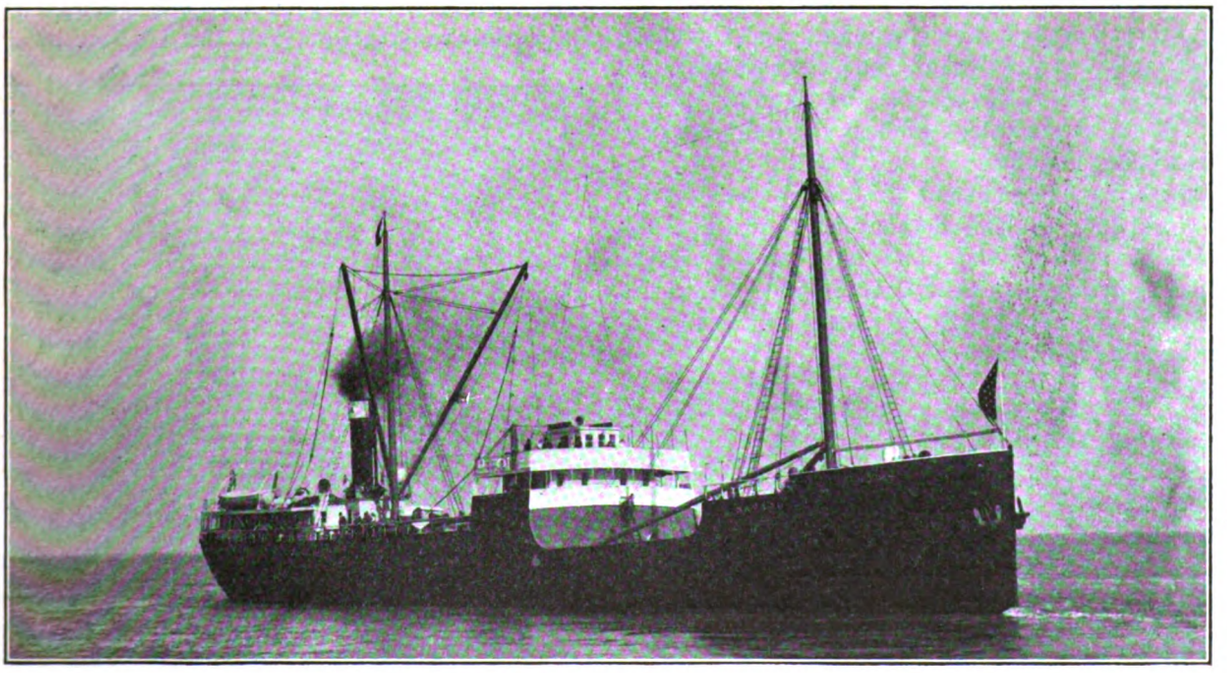
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The water front at the Craig yard

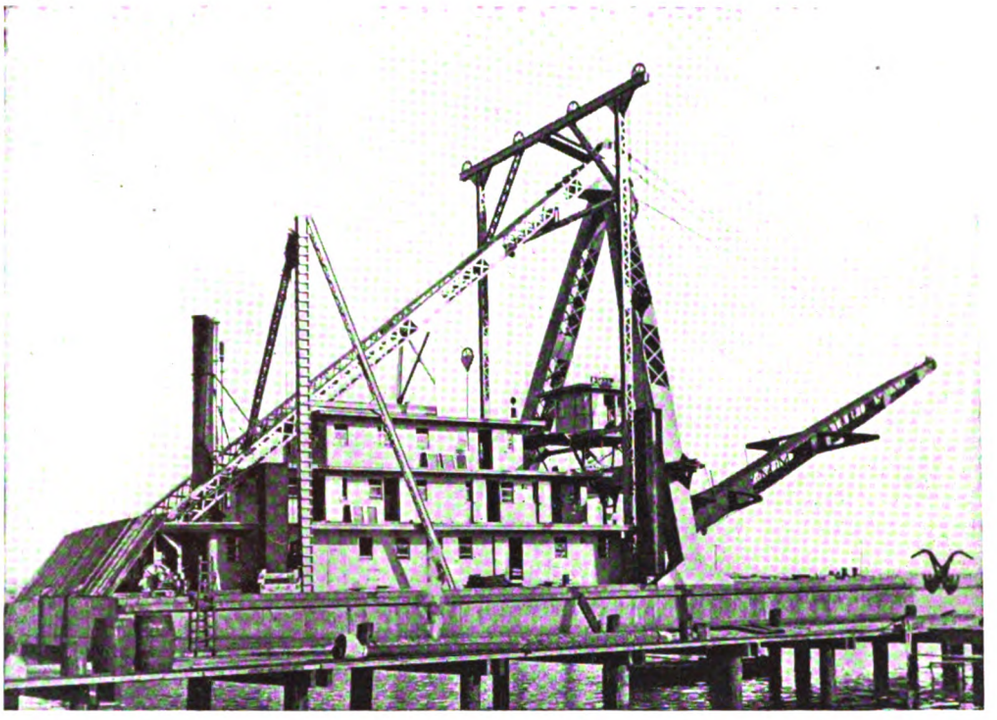


The "Alvarado" on the ways, ready for launching



The "Navajo," built at the Long Beach yard

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A Sacramento River dredge, built by the Craig Shipbuilding Company

The yard occupies a spacious sits two hundred yards from the ocean, and is reached through jetties leading to a channel crossed by the Salt Lake Railroad bascule bridge. Twenty-one feet depth is had at low water right to the shipyard, and the harbor is entirely free from rough water and surging.

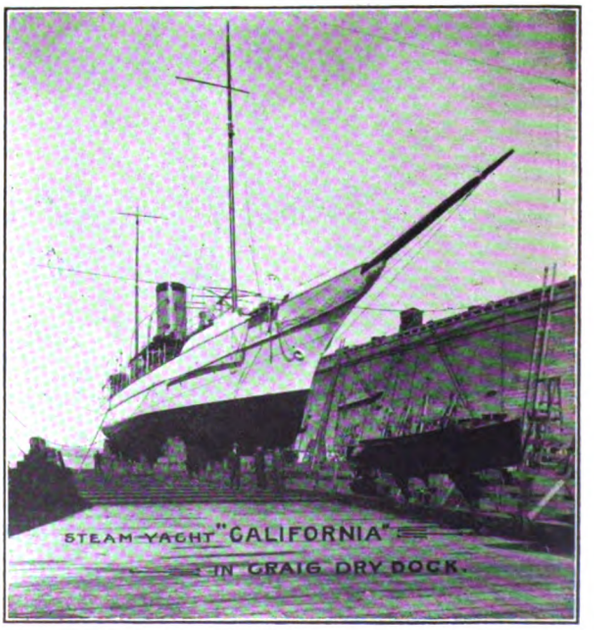
The lay-out of the yard in relation to the harbor readily adapts itself to the side launching method, and the long front is therefore fitted with building berths on that principle. Two large overhead cranes travel the entire length over the berths, and form, in conjunction with a large number of spur railroad tracks, minor swinging and traveling cranes and a narrow-gage push-car system,—an economical and rapid scheme for handling material. A set of sheer-legs of heavy lifting capacity is also being installed.

Considering the amount of repair and docking work done by the company the large floating drydock is one of the most important features. Designed by that eminent dock engineer, Wm. T. Donnelly, it represents the latest practice, and can handle 3500 tons deadweight. The design is such that when the business afforded warrants it, the dock can be greatly enlarged, by merely adding additional units to the length. It is self-docking, as any portion can be detached readily, should repairs be necessary, and lifted by the intact portion. The dock is quickly operated by capacious electrically driven pumps.

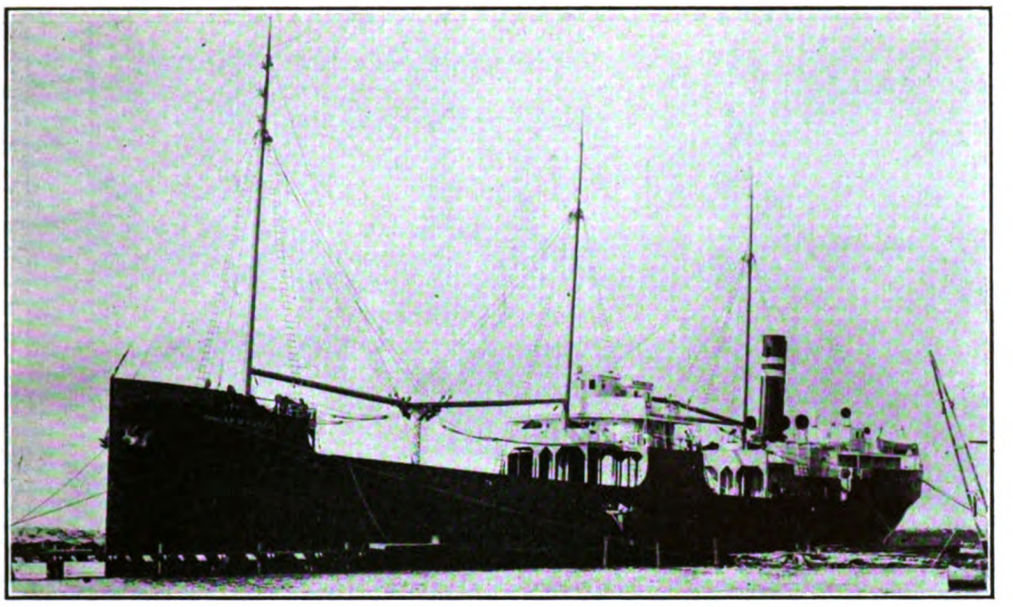
In the short time this yard has been operating many of the largest and most successful steel steamers on the Pacific coast have been constructed. Among them are the:

Tug "Virgil C. Bogue."
Steamer "Paraiso," 1383 tons gross.
Steamer "Camino," 3308 tons gross.
Steamer "Navajo," 2755 tons gross.
Steamer "Grace Dollar," 1327 tons gross.
Steamer "General Hubbard," 2183 tons gross.
Steamer "Edgar H. Vance," 2521 tons gross.
Steamer "Alvarado," 1383 tons gross.
Steel Suction Dredge "J. E. Upson."
Steel Suction Dredge "C. H. Windham."
Clam-shell Dredge "Holland.
Clam-shell Dredge "Redlands."

A portion of the yard has been assigned for submarine construction, and the U. S. submarine



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The "Edgar H. Vance," a typical west coast lumber carrier, built at Long Beach

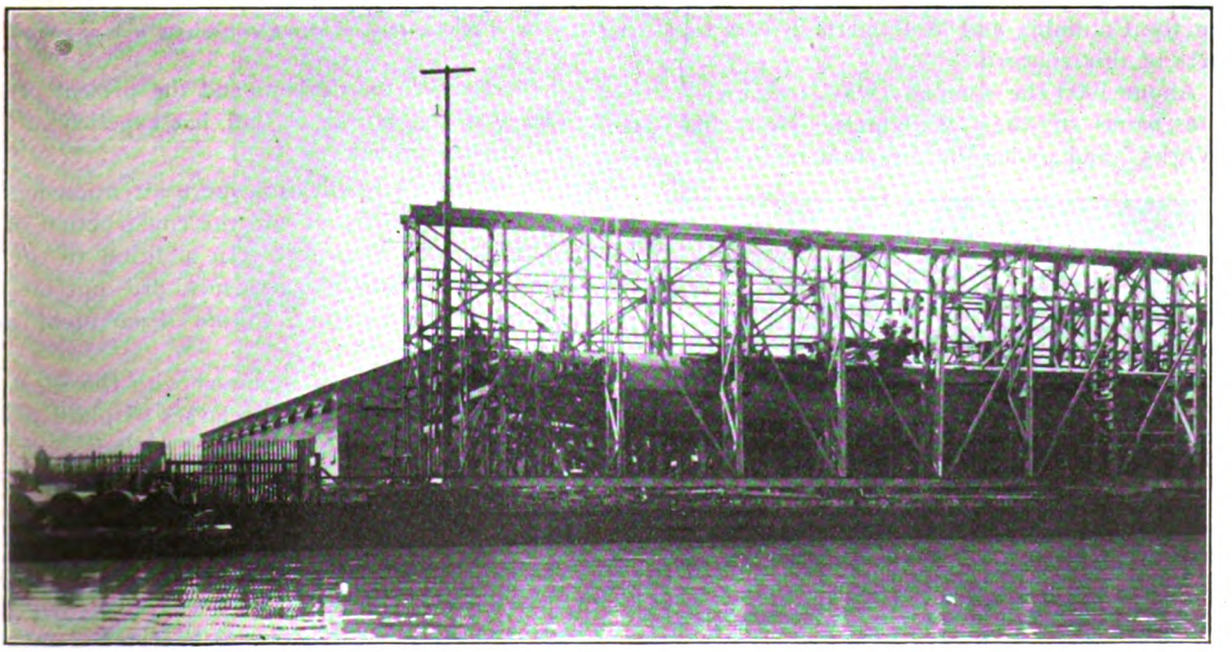
torpedo boats known as "L-6" and "L-7" are now nearly 60 per cent. completed and are well ahead of contract time. The submarine boats and destroyers already in commission, which use Long Beach as a base for cruising and target practice, frequently avail themselves of the yard's facilities for repairs. The Navy Department has the usual staff of inspection officers on duty at the plant.

Electricity furnishes practically all the power required throughout the plant, and oil fuel is used entirely. The Union Oil Co.'s pipe line runs into the yard and the Standard Oil Co. also has a service station on the property.

The photographs accompanying this article show the yard and some of the work handled by the company.

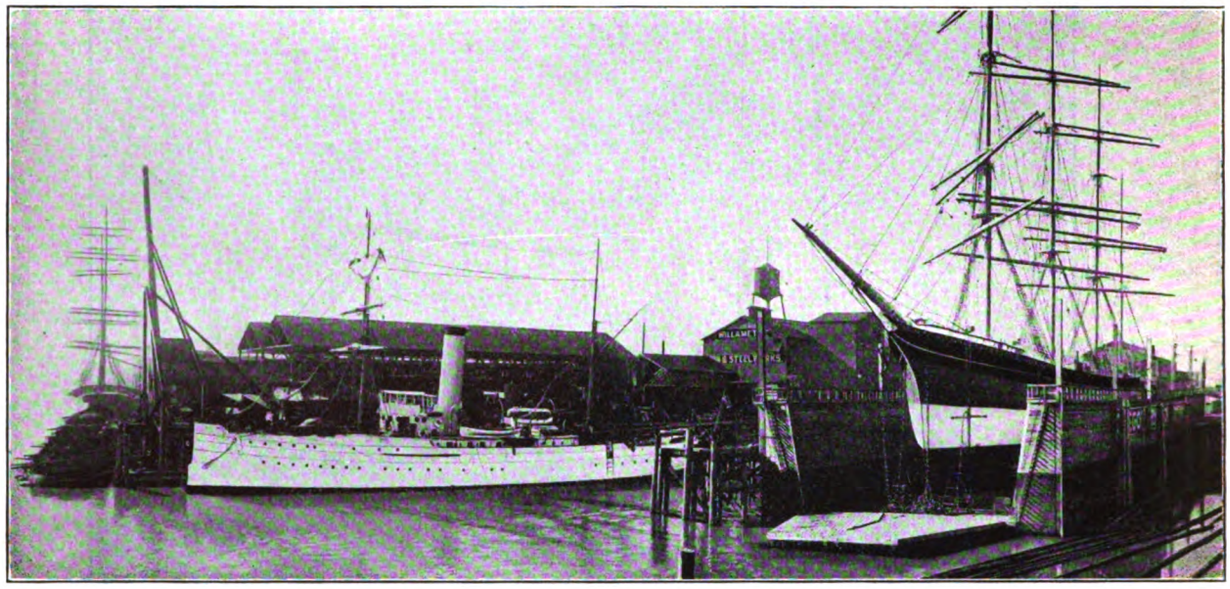
The plant throughout is equipped with the most modern machinery, air tools, etc., which are being extensively added to regularly, and when better times bring along the desired shipbuilding boom on this coast, the Craig company will continue to turn out with dispatch vessels of the highest quality.

John Craig is president of the Craig Shipbuilding Co., and John F. Craig, the founder of the company, is vice-president and general manager. F. W. G. Phillips is treasurer, A. L. Becker mechanical engineer, and E. O. Cutler assistant manager. Naval Constructor Paul H. Fretz and Carpenter Frederick Mackle represent the Bureau of Construction and Repair, and Lieutenant W. R. Monroe the Bureau of Steam Engineering.



A near view of the shipbuilding ways at the Craig plant

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Water front view of the Willamette plant

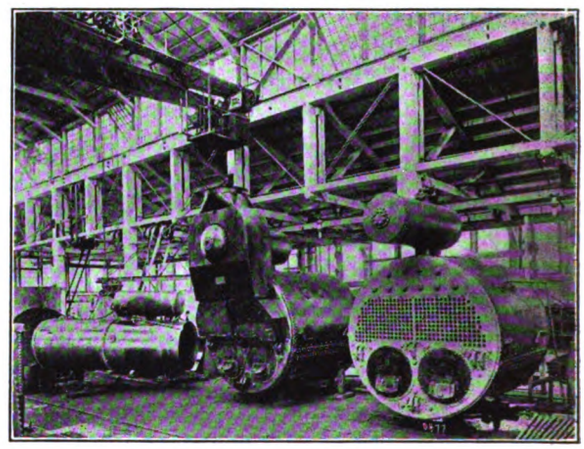
The Willamette Iron and Steel Works

One of the most important manufacturers of steel and iron products on the Pacific Coast is the Willamette Iron and Steel Works at Portland, Oregon.

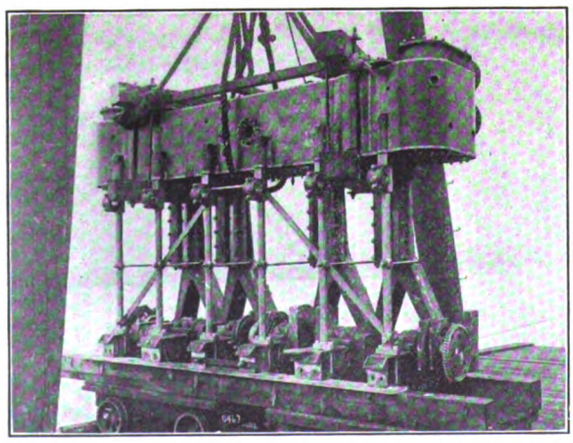
This company has a plant covering five acres of land, on the river front in the north end of the city, and employs from 350 to 400 men. The company is one of the pioneers in the metal trade in Portland, operating under the name of the "Willamette Iron Works" as far back as the early '60s.

During its early career, a general jobbing business was conducted in machine and foundry work, but special attention has always been paid to marine work. Many of the most famous crafts on the Columbia and Willamette Rivers are products of this concern.

About 1900 the company was reorganized under the name of the "Willamette Iron and Steel Works," and under the direction of the late president, Mr. W. H. Corbett, and the present president and manager, Mr. B. C. Ball, has experienced a most remarkable growth.



View in the boiler shop of the Willamette Iron and Steel Works

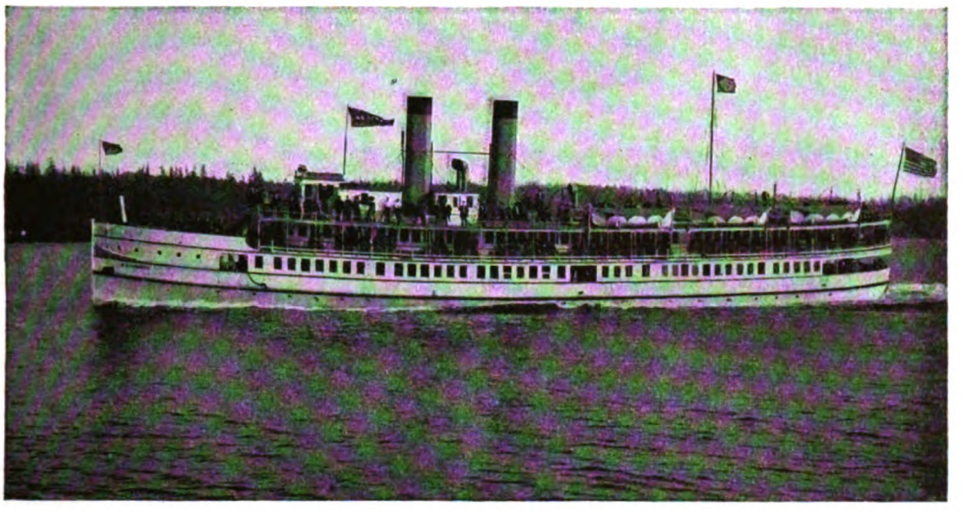


A 1000 H.P. triple expansion engine, built at the big Portland plant

Since its reorganization more attention has been paid to marine repair and the construction of steel ships for every purpose. In addition to the shipyard, two other departments are operated—the logging and hoisting engine department and a plate department.

The boiler shop is equipped with the most modern tools for handling all classes of plate work up to 1⅛" thick. The equipment includes two large plate planers, two bull riveters and a 150-ton flange press, besides a complete set of punches, rolls, etc. Some of the most important plate work on the Coast has been turned out of this shop; the largest being the penstocks for the hydro-electric development of the Stone & Webster Company at Big Creek, California.

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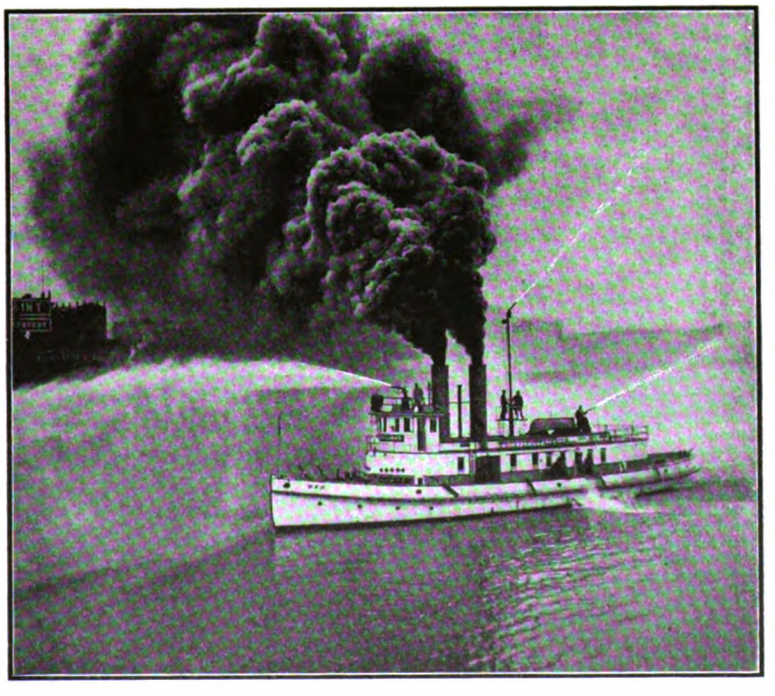


Steamer "H. B. Kennedy," another type of the Willamette Iron and Steel Works' output

The location of the Oregon Drydock Company, adjacent to the Steel Company's plant, makes it possible for them to carry on efficiently and economically all ship repair work. The shipyard is the only one in Portland in which steel hulls are constructed, and in fact practically all the marine work of any importance in the Port of Portland has been done in these yards.

Early in 1909, the "H. B. Kennedy" was turned out of these yards for the Navy Yard Route at Seattle, to ply between Seattle and Bremerton. This boat is recognized by all designers and shipbuilders to be one of the finest boats of her class in the world. Her speed records have attracted wide attention and the reliability and the performance of her engines during the past six years has been remarkable.

Some of the other products of the yards include the U. S. Artillery Tenders "General Barrett" and "General Fornance," the ocean-going tug "Oneonta," belonging to the Port of Portland, the steel dredge "Willamette," and a large fleet of barges ranging from 500 tons to 1000 tons.

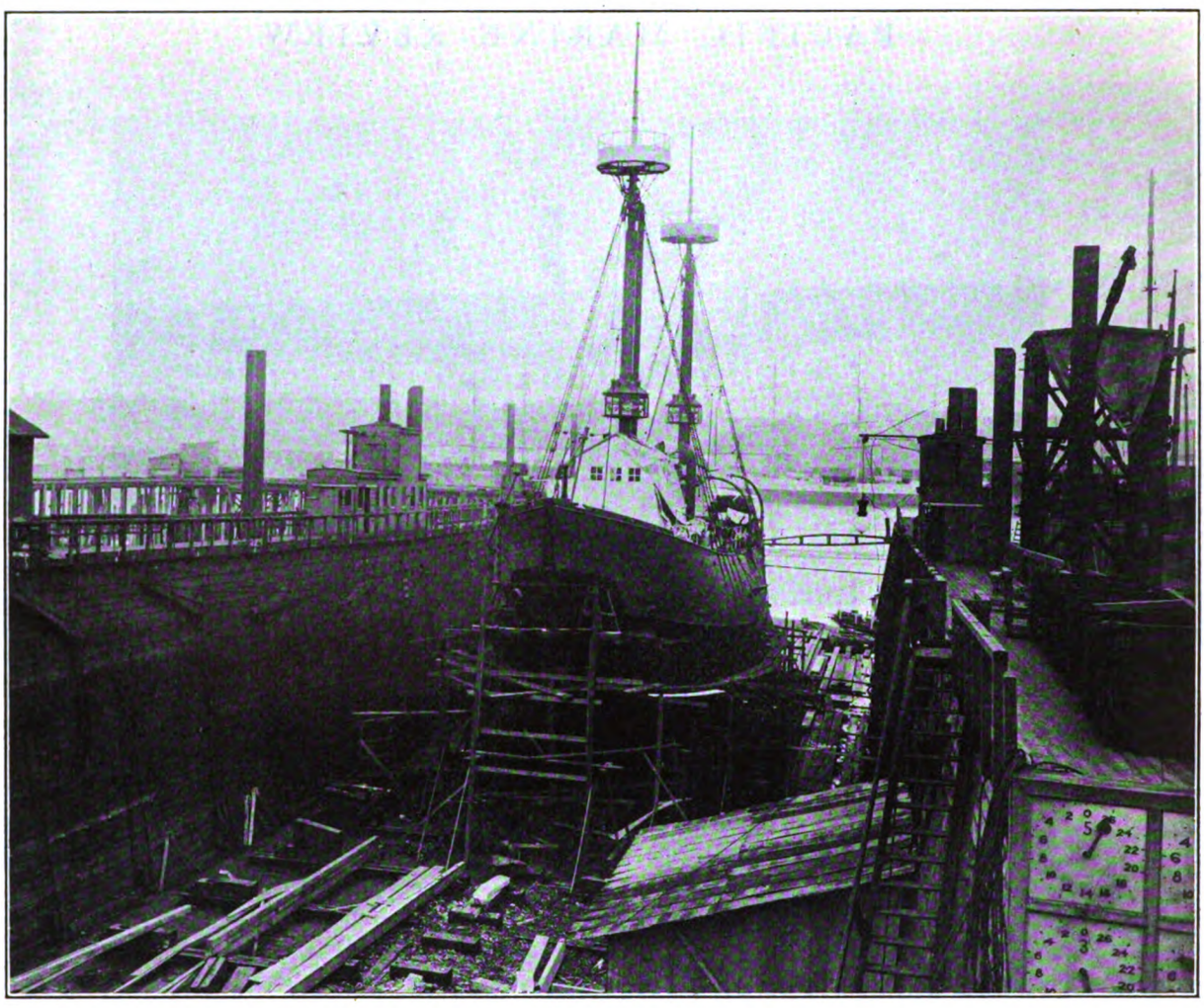


The Portland fireboat "George H. Williams," a Willamette craft

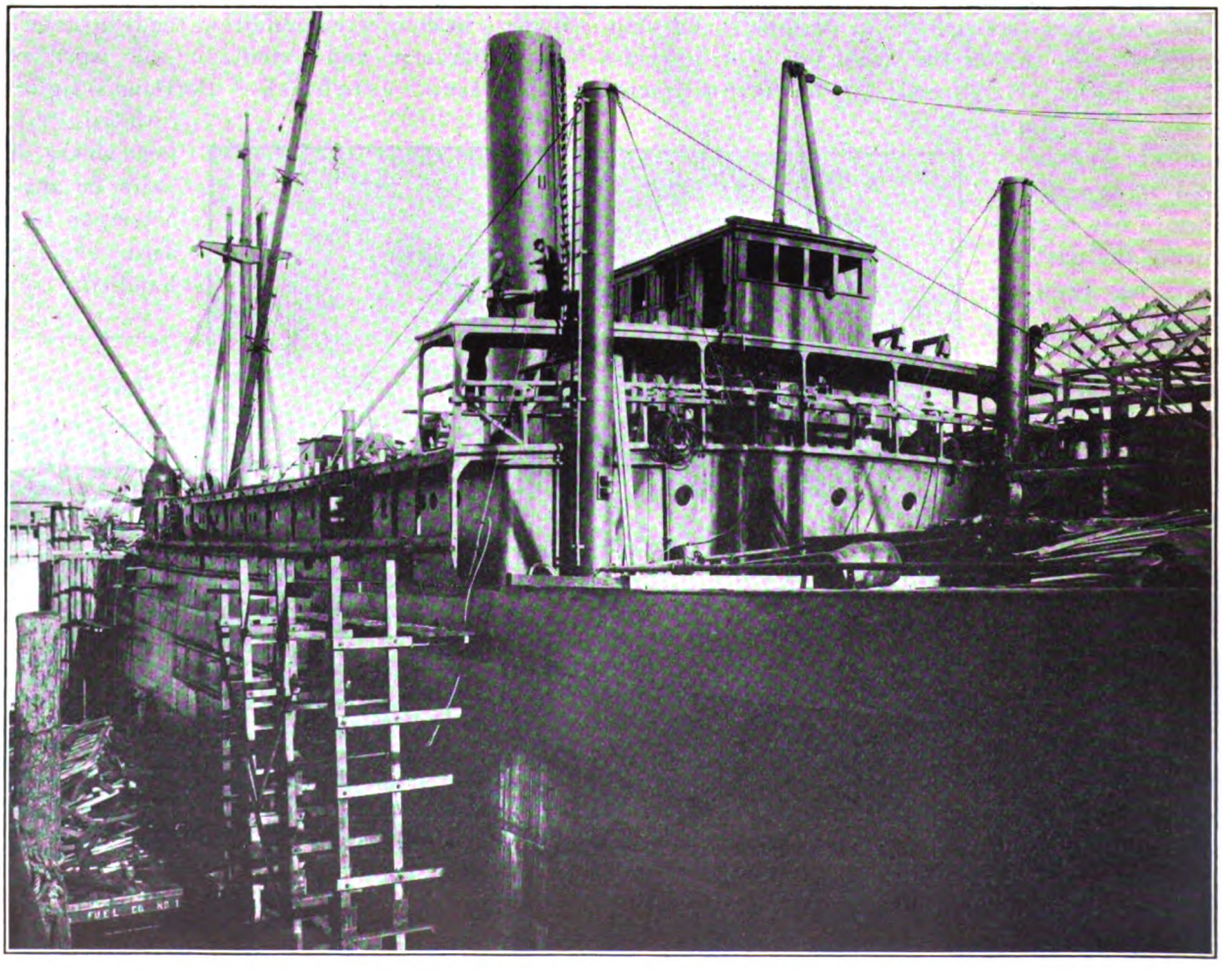
That the Willamette Iron and Steel Works are well fitted to take care of all classes of marine repair work of almost any magnitude was demonstrated this winter by carrying to a successful completion the reconstruction of the 10,000-ton W. R. Grace steamer "Santa Catalina." This ship, which is 420 feet long and 54 foot beam, was practically entirely destroyed for about 150 feet amidships by fire in Portland harbor in October, 1914. Sixteen weeks after the delivery of the ship to the Portland plant, she was turned over to her owners in completed condition ready to take cargo. The character and extent of the work on the "Catalina" establishes Portland's right to be considered as a port where ship repairs of any character can be safely and expeditiously handled.

Two new coast guard cutters were launched on April 20th at the plant of the Newport News Shipbuilding and Drydock Company at Newport News. They are the "Ossipee," for use off the coast of Maine, and the "Tallapoosa," for the Gulf of Mexico.

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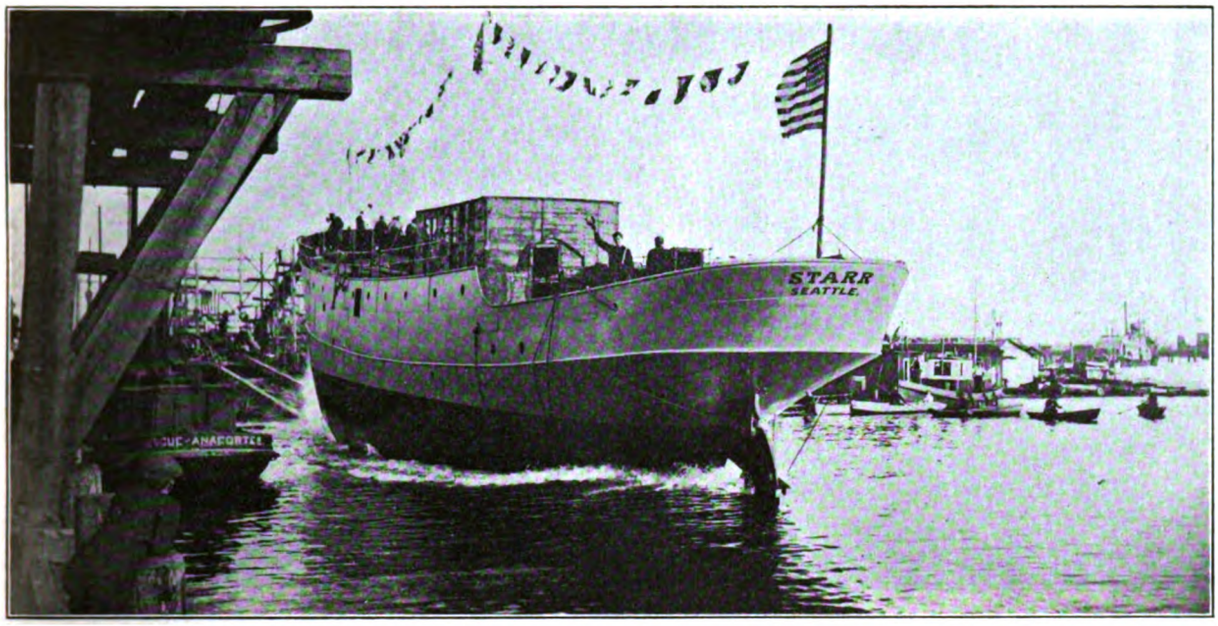


"Lightship No. 67" in drydock at the Willamette Iron and Steel Works



View of the renewed deck house and bridge of the S. S. "Santa Catalina"

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Launch of the "Starr" at the plant of J. F. Duthie and Company

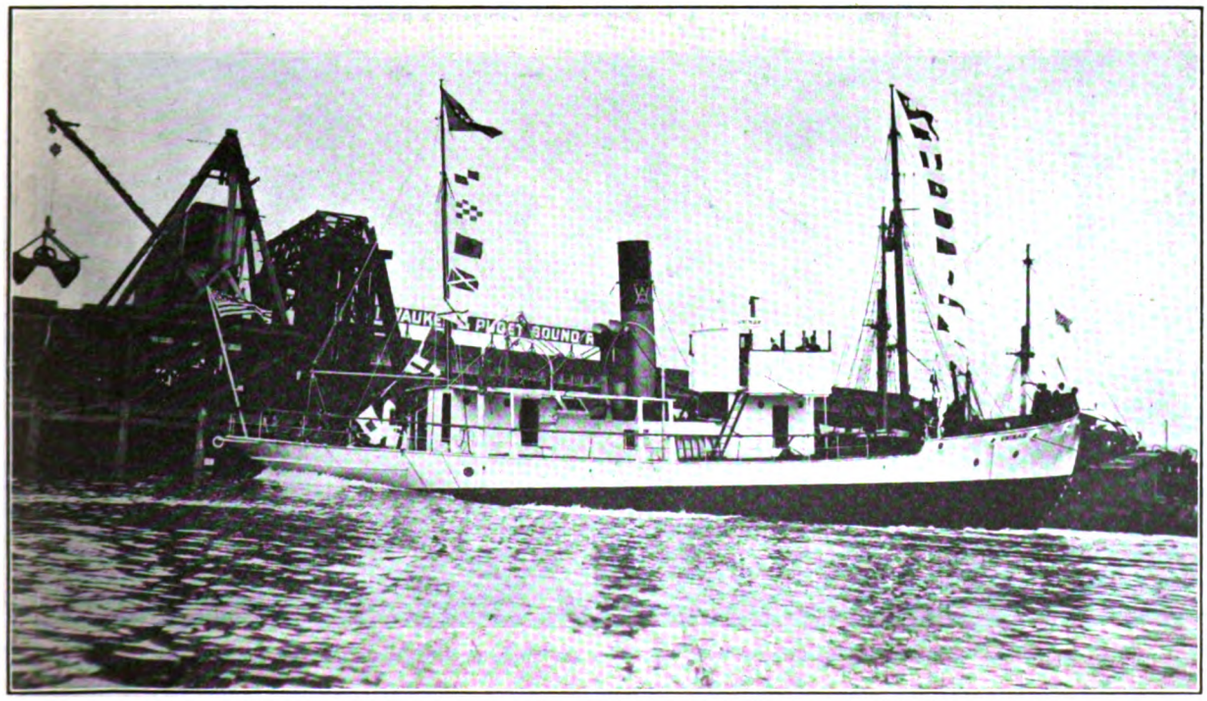
J. F. Duthie and Company

THIS firm has been in operation in Seattle for a period of about three years and has constructed during that time four steel and one wooden vessel of the following sizes: Two steam whalers 112 feet long, one halibut fishing steamer 140 feet long, one ferry steamer 169 feet long and one wooden cannery tender 140 feet long. While this new construction was going on, the yard also undertook a large number of overhaul and repair contracts.

The J. F. Duthie and Company's plant is equipped to handle steel vessels up to 200 feet in length and has the necessary tools and equipment to make rapid progress on any work which is undertaken—in fact, this firm, upon its entrance into the shipbuilding game, constructed, launched and delivered two steel whalers within ninety-five days, no preliminary work having been done on the steel hulls.

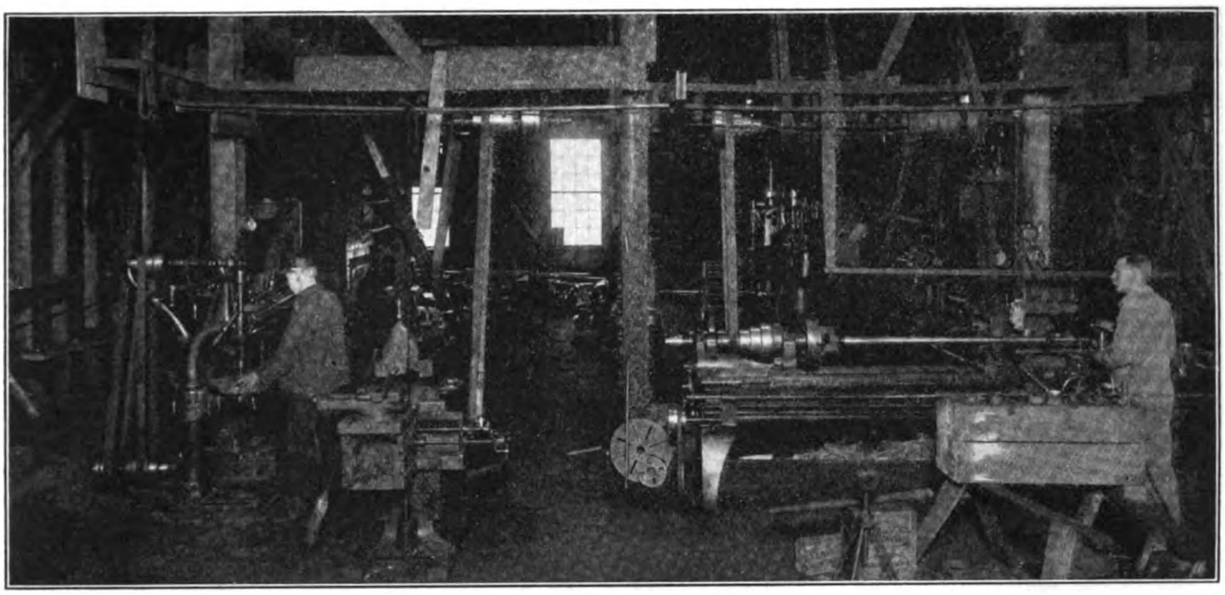
The Chicago, Milwaukee and Puget Sound Railway tracks serve the J. F. Duthie and Company plant, and materials are handled from the cars to the ship ways and shops by a series of derricks operated by winches.

The firm specializes on winches and have designed and constructed six separate special types of steam winches ranging from the large whaling machines to steam anchor windlasses. Hoists to meet special requirements also form no inconsiderable part of the firm's business.

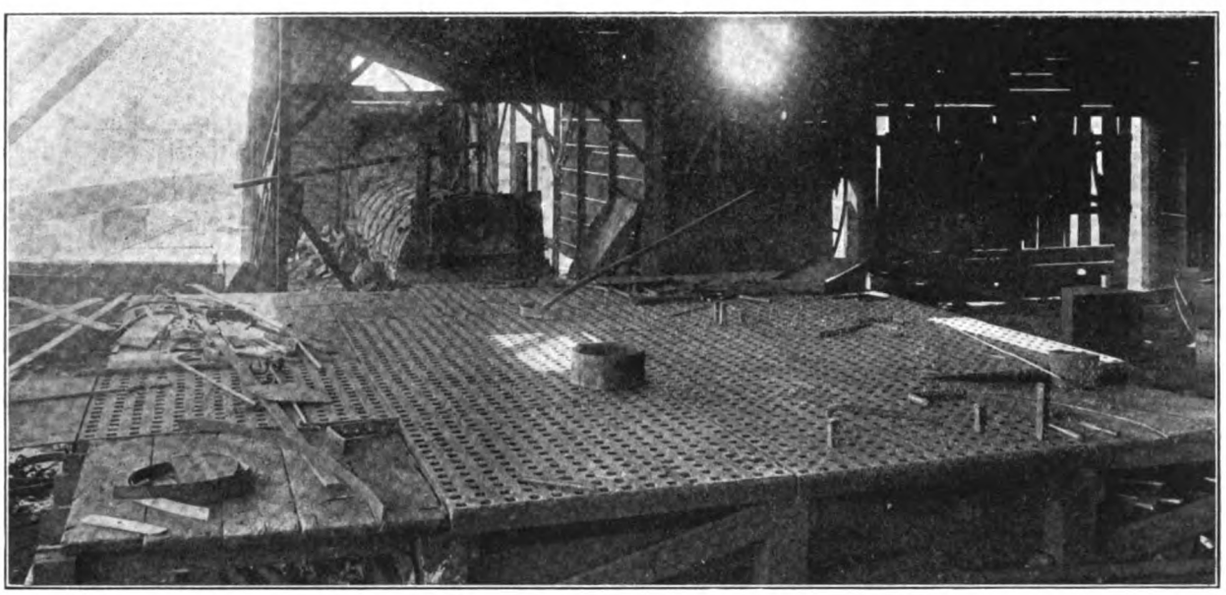


Another of J. F. Duthie and Company's products

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A view of the machine shop

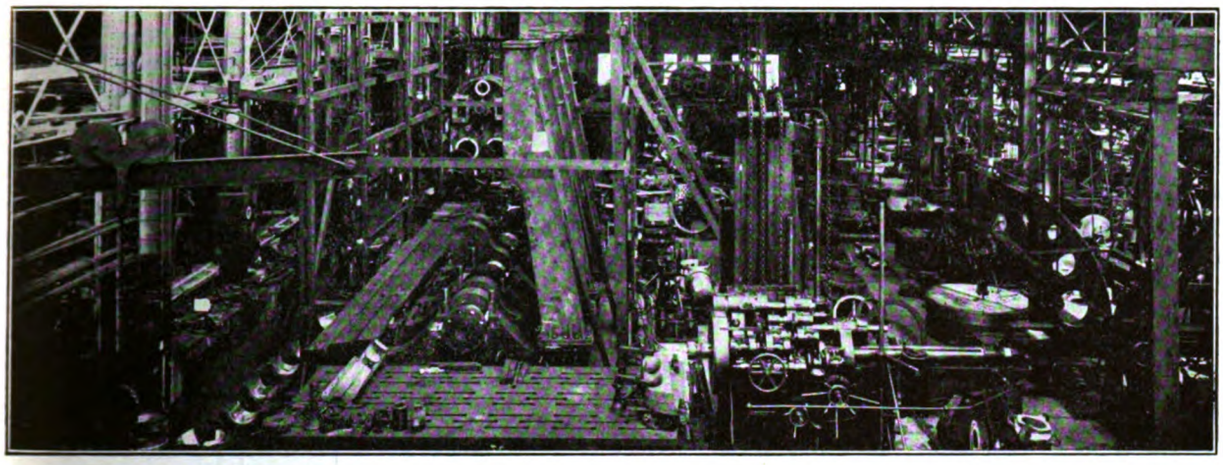


Another interior of the J. F. Duthie and Company's plant



J. F. Duthie and Company at Seattle are well equipped to handle new construction and repair work

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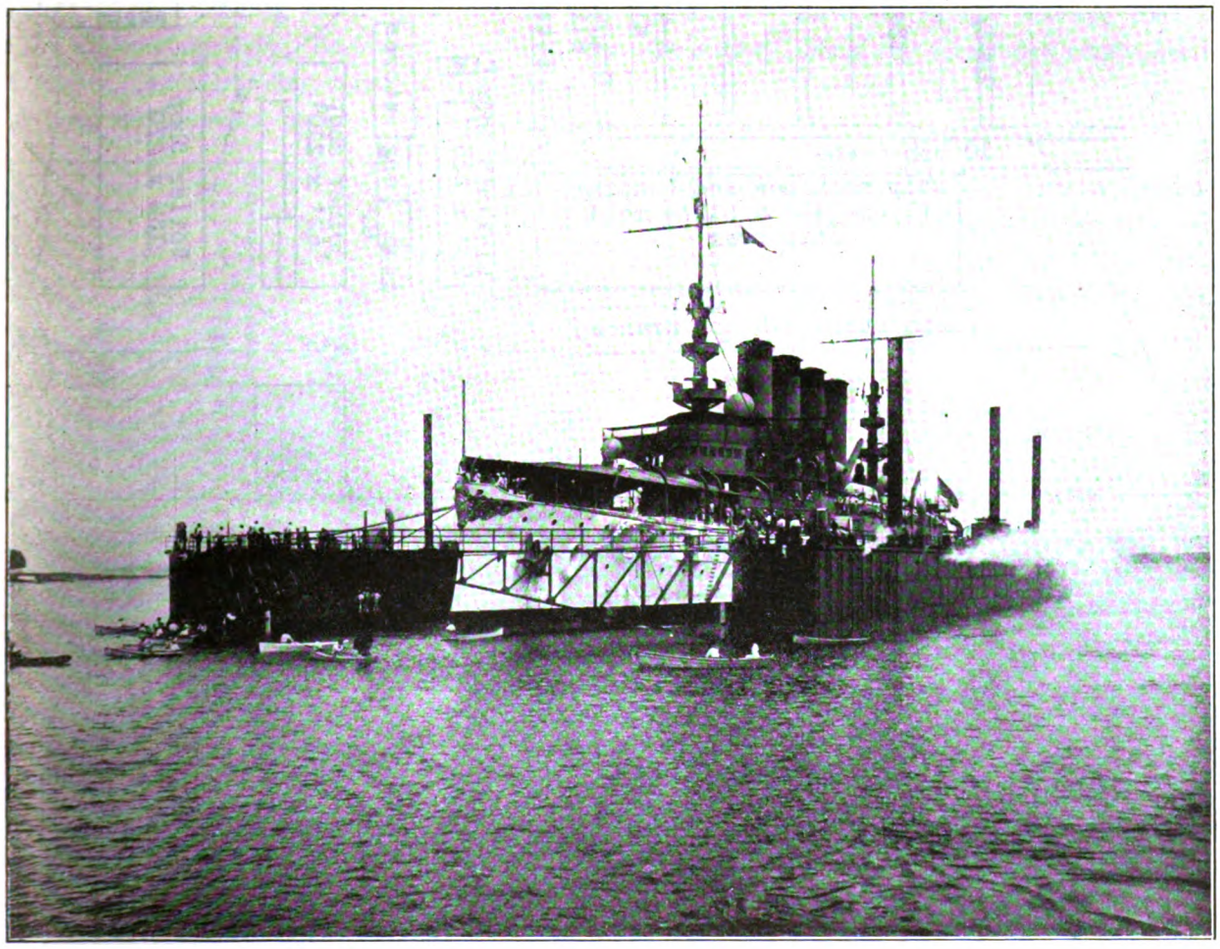
Machine shop of the Maryland Steel Company, showing the erection of a reciprocating engine

The Maryland Steel Company

THE following cuts show the general layout and some departments of the Maryland Steel Company, situated on the Patapsco River, twelve miles below Baltimore, Maryland.

This company operates one of the most complete and up-to-date shipbuilding plants in the country, and has done extensive work for the United States Government in the construction of suction dredges, torpedo boat destroyers, colliers and the Dewey Dock. It has also constructed many vessels now in use by our Merchant Marine, amongst which are eight steamships for the American-Hawaiian Line, two additional ones having recently been contracted for.

The Maryland Steel Company, which was started in 1887, is the tidewater plant of the Pennsylvania Steel Company; which is the oldest company of its kind in the United States, having been organized in 1865.

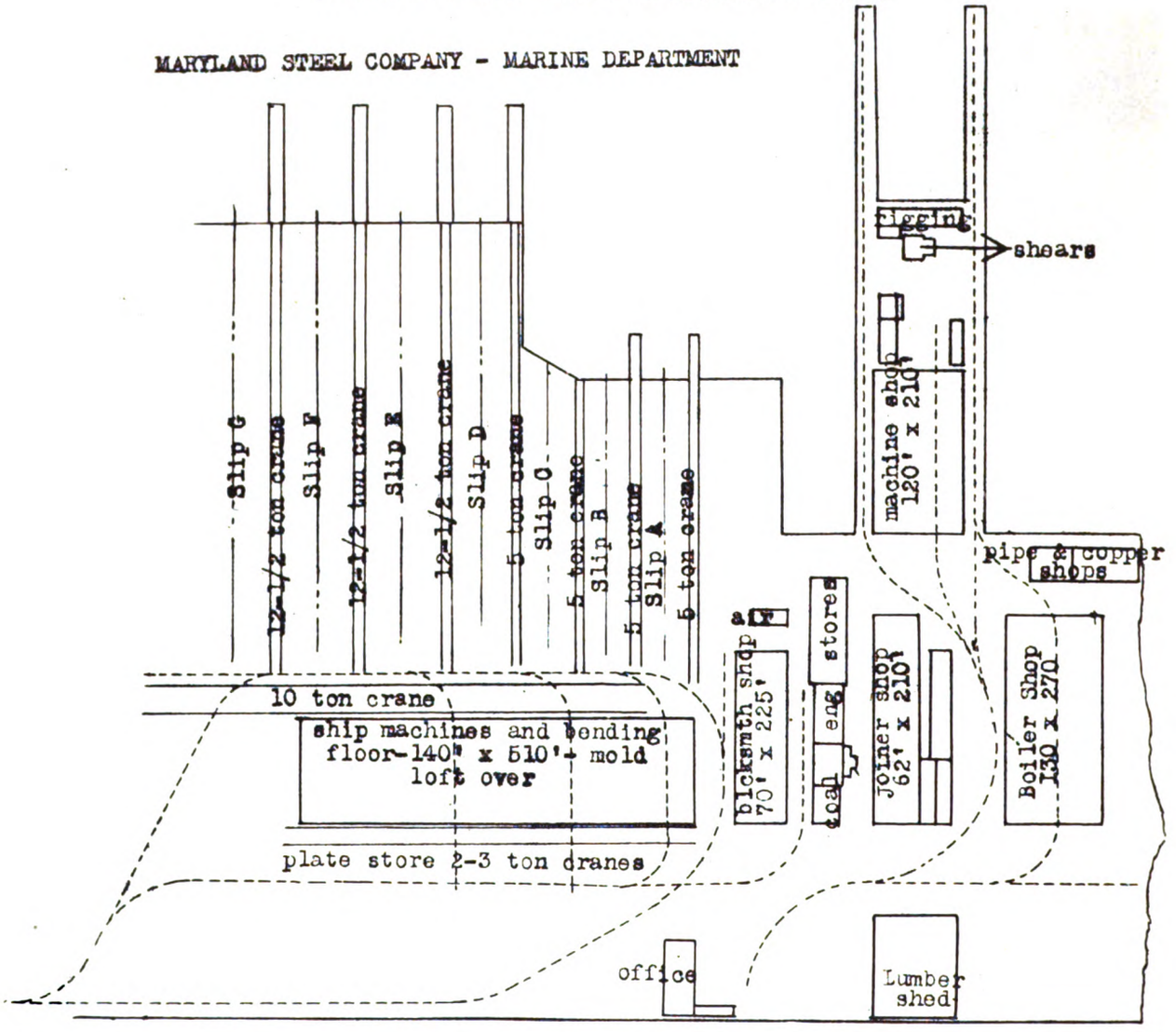


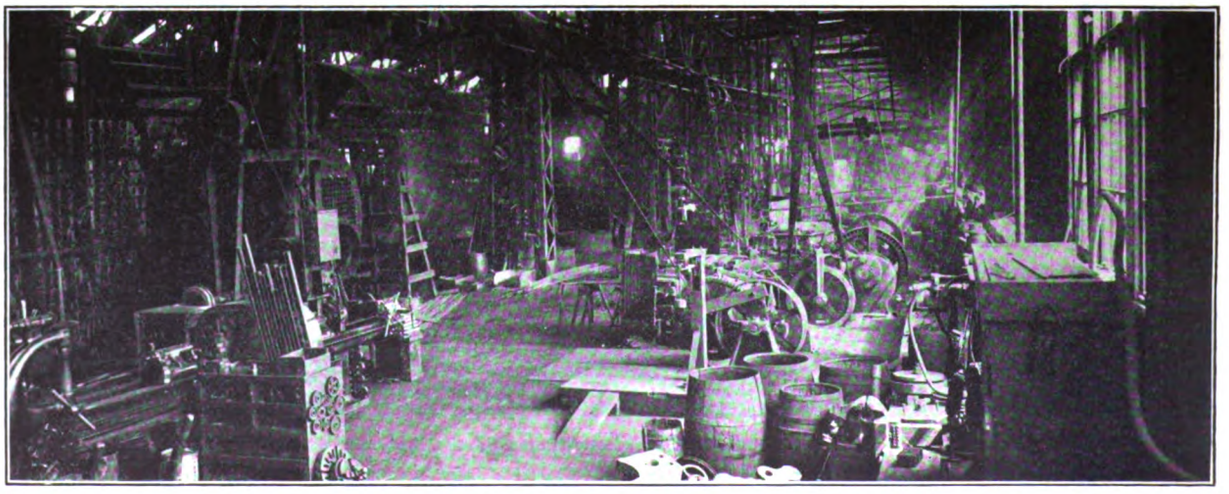
The drydock "Dewey" at Cavite. This dock was constructed by the Maryland Steel Company

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Vessels at the fitting-out wharf of the Maryland Steel Company



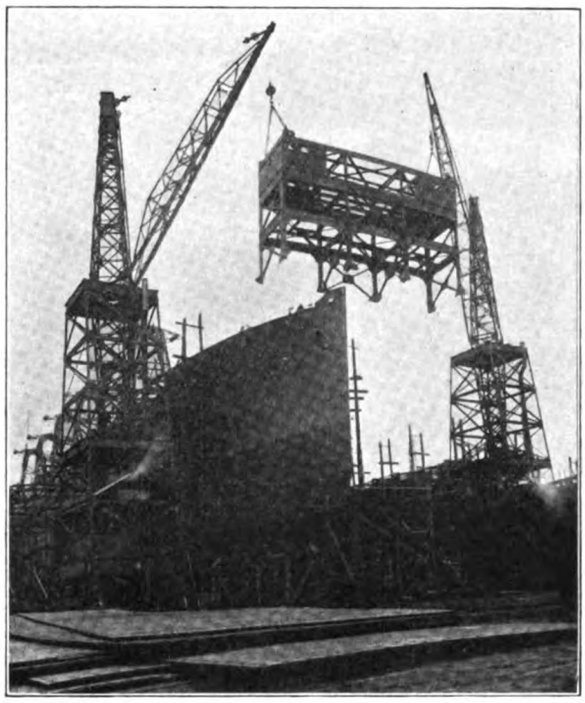


Boiler shop at the Maryland Steel Company's plant

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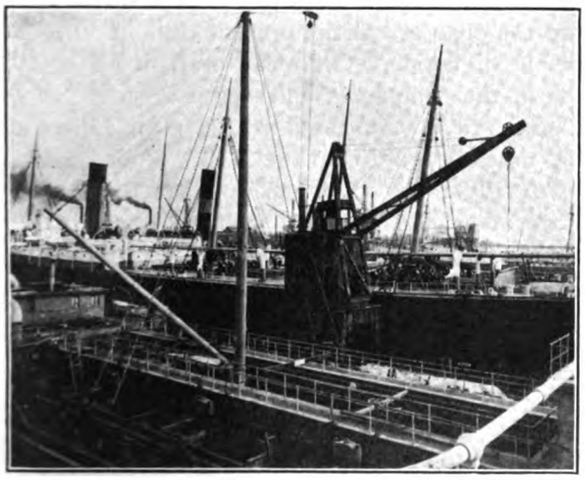


Tower crane at work on vessel, Maryland Steel Company



Tower cranes placing bridge structure on the "Orion"

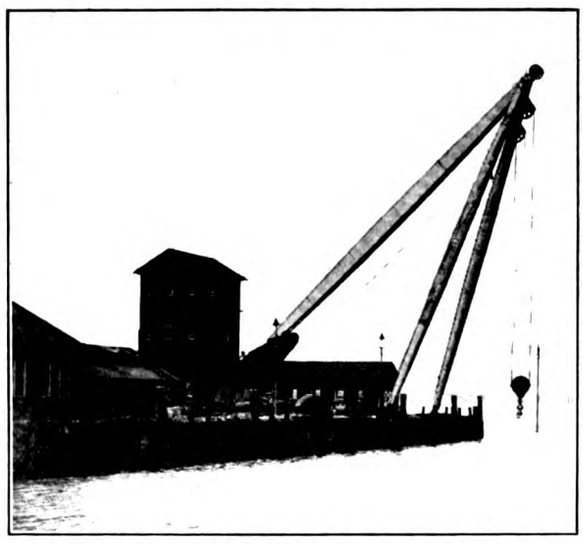
There are six shipbuilding berths, but two of the smaller berths are now being converted into one large one. The ship machines and bending frames are located in a large building extending across the head of the shipbuilding ways. Between this building and the slips a ten-ton traveling crane traverses the ways and from this conveyor plates and shapes are transferred to traveling tower cranes of 12½ tons capacity which run the full length of the building ways. As these tower cranes are between each building ways it is possible to handle twenty-five-ton weights working two cranes in unison. On the inboard side of the ship machine building is the plate storage served with overhead traveling cranes. The fitting out wharf is supplied with heavy shear legs.



New construction under way at the plant of the Maryland Steel Company

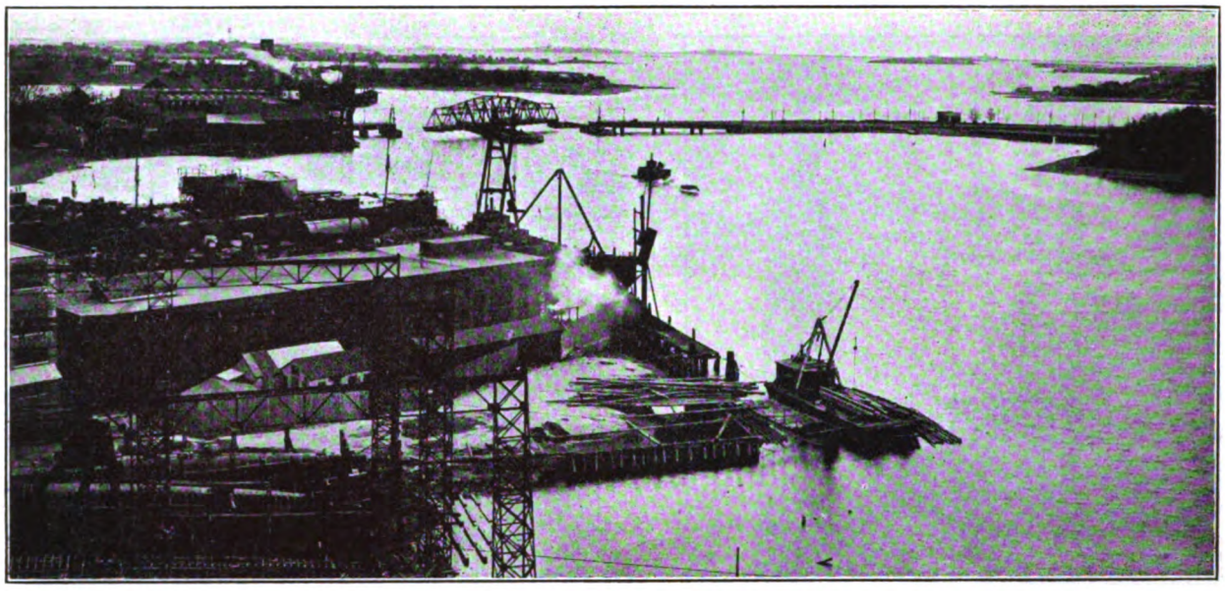
The Maryland Steel Company builds boilers and engines as well as hulls and the group of shops are located directly back of the fitting out wharf. A thorough system of railroad trackage connects up the various shops, and locomotive cranes aid in the handling of material.

The ruling placing a limit of Panama Canal tolls at $1.25 per American net register ton has made it necessary for all foreign vessels to be measured and secure an American net register tonnage certificate. The general effect will be to lower tolls somewhat.



100-ton shear legs on the fitting-out wharf at the Maryland Steel Company's plant

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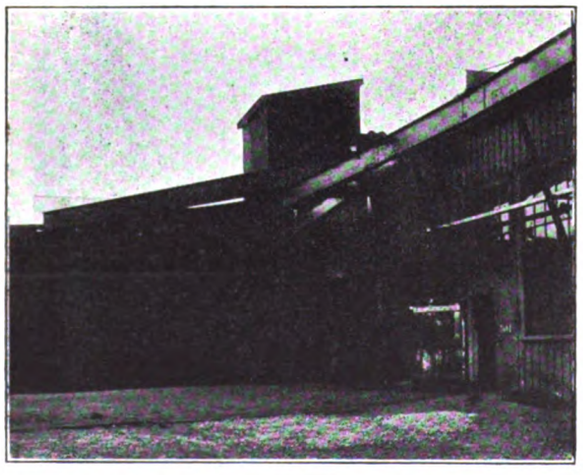
View of water front from top of main ship structure

The Fore River Shipbuilding Corporation

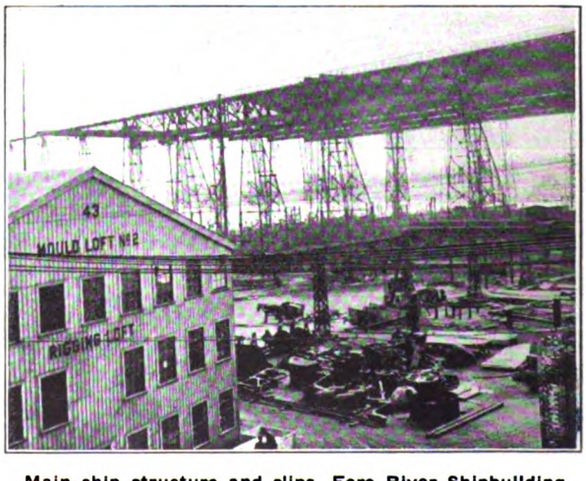
THE Fore River Shipbuilding Corporation is a subsidiary of the Bethlehem Steel Company and was established in its present location in 1900. Its predecessor was a smaller yard for the building of yachts and machinery, located at Weymouth Landing, about two miles from the present yard. As a result of the large amount of Government work for the Navy in 1900, because of the Spanish-American war, the company at Weymouth Landing had received contracts for the torpedo boat destroyers "Lawrence" and "MacDonough" and for the sheathed protected cruiser "Des Moines," and were low bidders for the battleships "New Jersey" and "Rhode Island." This large amount of new business necessitated the establishment of a larger and a more modern plant, which was established at Quincy Point, on the Weymouth Fore River, in the year 1900, in a location that had been celebrated for two centuries as a shipbuilding center for sailing vessels, one of the oldest shipyards in the United States having been located not far from the present plant.

The shipyard proper embraces an area of about 40 acres, and there is in addition a large amount of outlying property. It is about five miles from Boston Light—in fact is nearer the open sea than the principal docks of the City of Boston. It is located on a completely landlocked harbor, safe from damage from the violent storms of the North Atlantic and well protected by the fortifications of Boston Harbor in time of war. It has a channel depth to the open sea at the present time of 30 feet of water at high tide. The mean draft of water at low tide at the company's wharves is 28 feet.

The shipyard is connected by its own railway line, 1⅝ miles in length, to the N. Y., N. H. & H. R. R. Co., Plymouth Division, at East Braintree. There are about 3½ miles of railroad line within the company's plant, so that material received can be delivered to any part of the plant and handled

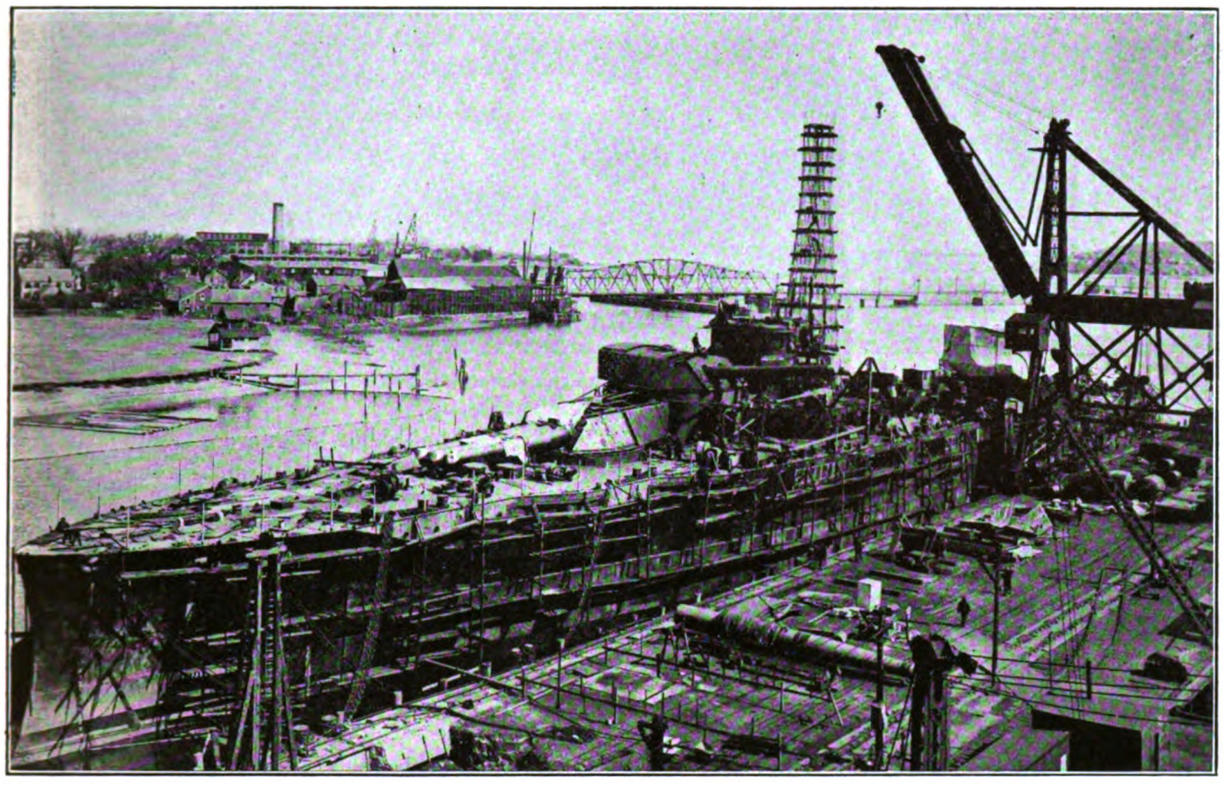


A section of the monorail overhead system



Main ship structure and slips, Fore River Shipbuilding Corporation

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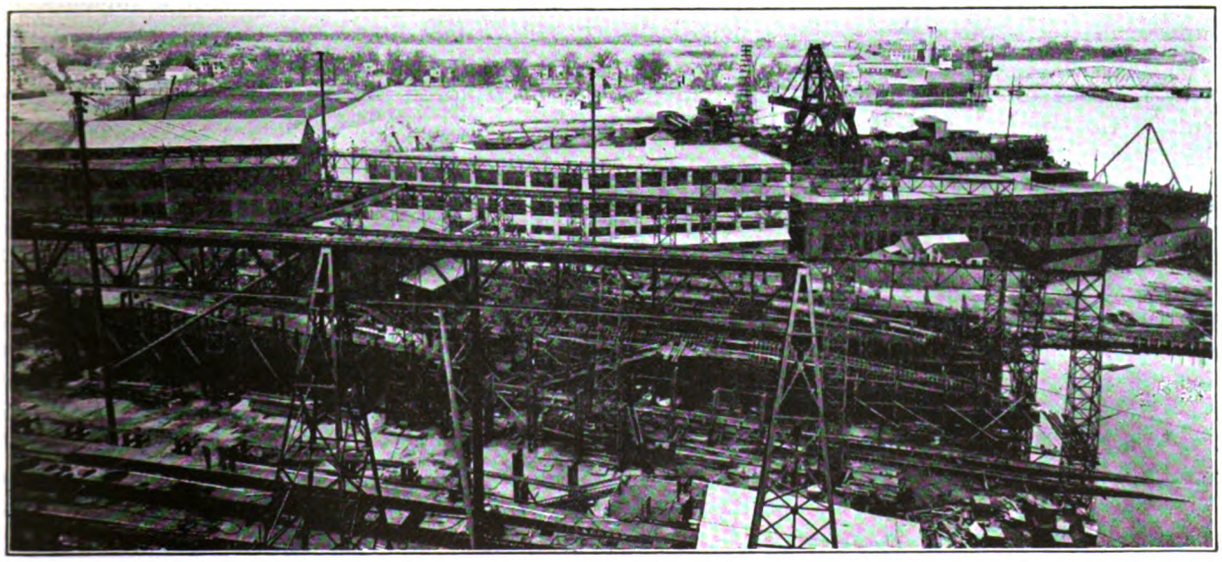
U. S. S. "Nevada" at the fitting-out wharf, Fore River Shipbuilding Corporation

by overhead traveling cranes or industrial locomotive cranes to any point desired.

The shipyard has nine building slips, lettered from A to J, and all of these are now covered by overhead cranes. The slips A, B, C and D have 5-ton overhead traveling cranes; slips E, F and G have two 10-ton traveling cranes, and slips H and J, which are under what is known as the overhead ship structure which was erected in 1901, are each fitted with two 5-ton cranes.

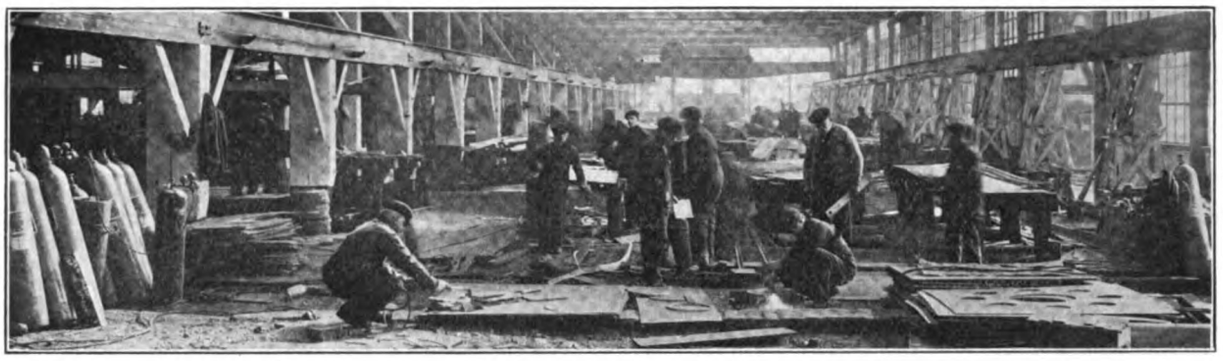
Structural steel material is received in the shipyard on cars which are shunted promptly to the plate yard, where the material is unloaded and distributed by three 10-ton gantry cranes. From here the material is handled into the steel working shop by means of a monorail system, shown in photograph No. 1. Material is transported to the various machines inside the shop by small tracks or overhead cranes, and is handled at the various machines by means of cranes until ready to be sent into the yard. Small material is assembled and completed within the shop. Larger pieces of material, plates and shapes are handled under a runway situated outside of the main shop, as shown in photograph No. 2. This space is spanned by a crane 96 feet long of 10-ton capacity.

From this assembling space the material is transported by industrial railway or by overhead cranes directly to its location on the building slip. While in many respects better than the iron working



New construction under way, with new storage structure in the background

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Wing of ship tool shop, showing oxy-acetylene cutting torches at work

shops of most of the other shipbuilding plants, the company is now considering the building of an entirely new iron working shop, which it is expected will be superior to anything in existence.

The present machinery, however, for handling structural steel work is so modern that it is expected to use a large percentage of it in the new building.

The company receives by water its coal and some shipments of lumber, but all other shipments of whatever character are received by rail.

For ships completing in the water there is dock space as shown in photograph No. 3, where there is a minimum depth of 28 feet alongside the long dock and which is served by a traveling gantry crane with a maximum lifting capacity of about 100 tons, and which has actually placed turrets weighing 92 tons in their position at the center line of a battleship.

In the basin where smaller boats are berthed, the material is handled on board by means of industrial cranes.

For the distribution of material around the yard, the company has in continual operation two locomotives and 22 flat cars, four industrial cranes which can lift 15 tons weight, and for the handling of miscellaneous small material there are two auto trucks, one gasoline of 3½ tons capacity and the other electric of two tons capacity.

In addition to the structural iron work department, the yard is equipped with all of the other machinery required for the building of high grade merchant or Government vessels, as well as any grade of cargo boats.

The machine shop shown in photographs Nos. 4 and 5 is 520′ long and 118′ 0″ wide, fitted with overhead cranes running the entire length of the shop. Some of the special machines in this shop are as follows:

Fig. A—Boring mill for turret track with a swing of 32 feet.

Fig. B—120″ planer.

Fig. C—Large lathe for turning shafting, capable of boring a shaft 50 feet.

Fig. D—Specially constructed lathe for turning turbine rotors up to 12 feet in diameter.

There is probably no shipyard machine shop in the country equipped with an equal amount of up-to-date machinery. At times an output in excess of 1,000,000 pounds machined material per month has been reached. All of the heavy work is done on the main floor, which is served by the overhead cranes mentioned before, and there are two galleries running the entire length of the shop on which the lighter grades of work are done, one gallery of which is devoted entirely to brass work.

Pipe Shop: This shop is equipped with all the necessary tools for the cutting, threading, bending and working of iron, steel, brass and copper piping. There is a sheet metal shop for all kinds of light sheet metal work, special brass work and wire work.

Shipwrights, joiner and patternmakers' shop has an up-to-date equipment of machinery and ample space for handling all kinds of wood work.

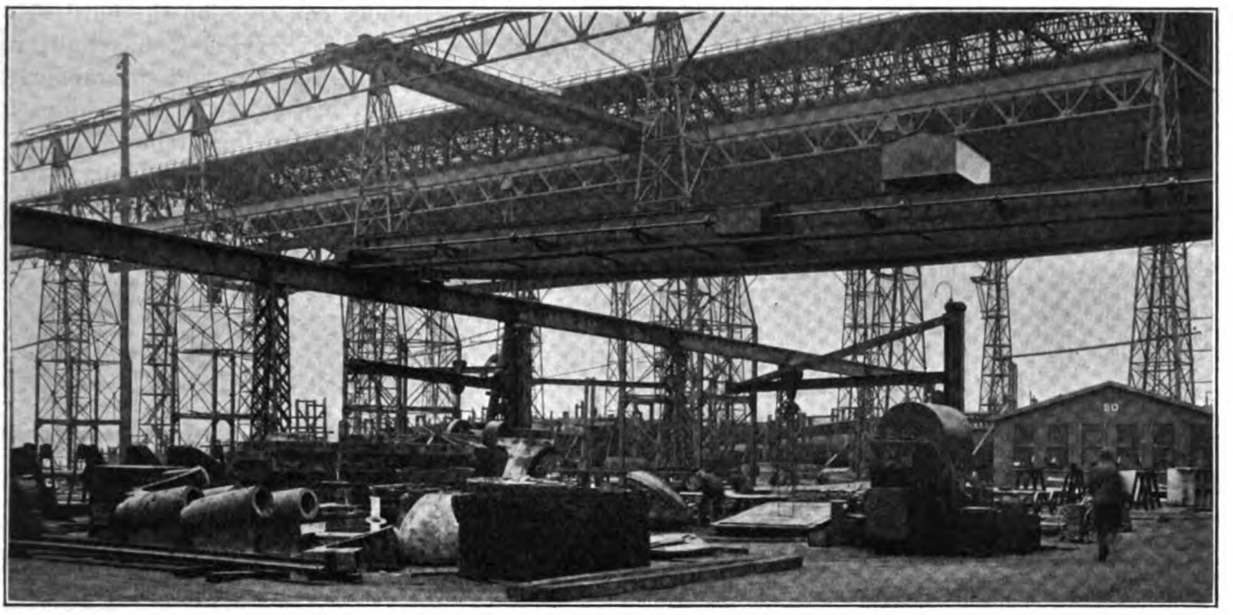
There is a brass foundry, where all the brass castings for the plant are made. The output of this shop for the month of January was 339,000 pounds of good castings, an output which we doubt has ever been equaled in a foundry of this size anywhere.

The blacksmith shop is up-to-date in all particulars.

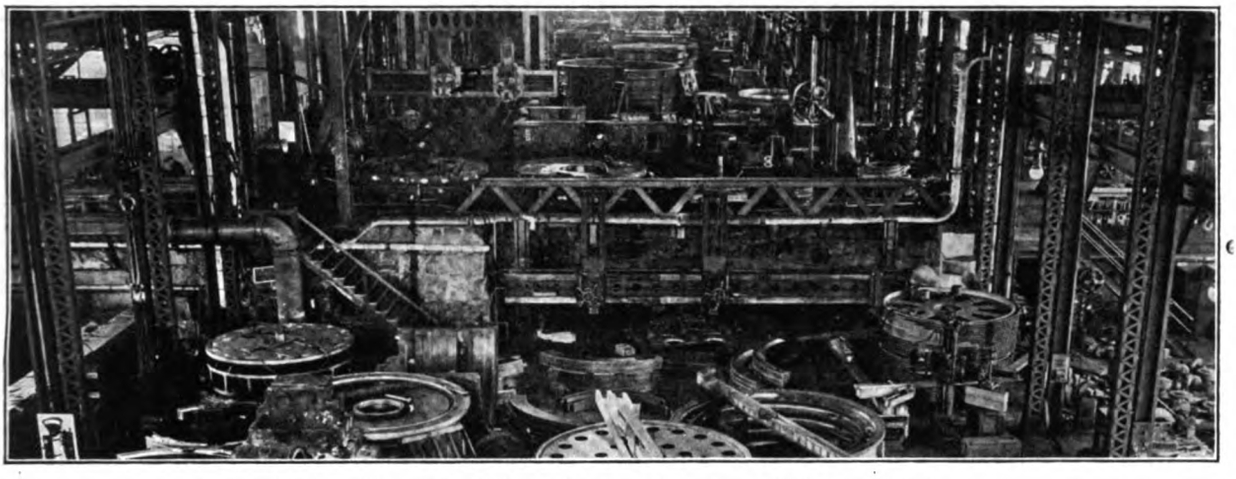
There is an electrical workshop and a rigging loft, also a galvanizing plant with a capacity in excess of 250,000 pounds per month; a boiler shop for the building of water tube boilers, and small buildings required for the construction of various auxiliaries used in shipbuilding.

A special feature of the plant is a new storehouse shown in photograph No. 6. This building is of brick and steel and concrete construction, consisting of a basement and three complete floors, and a mezzanine floor. The main floor is fitted with an overhead crane for the handling of heavy material, and an elevator is provided for serving the other floors. This building was recently constructed and is intended to handle in the most efficient manner all raw material, also the semi-finished and finished material used in the construction of ships, except plates and shapes and the larger castings. It is believed that the question of the efficient storage

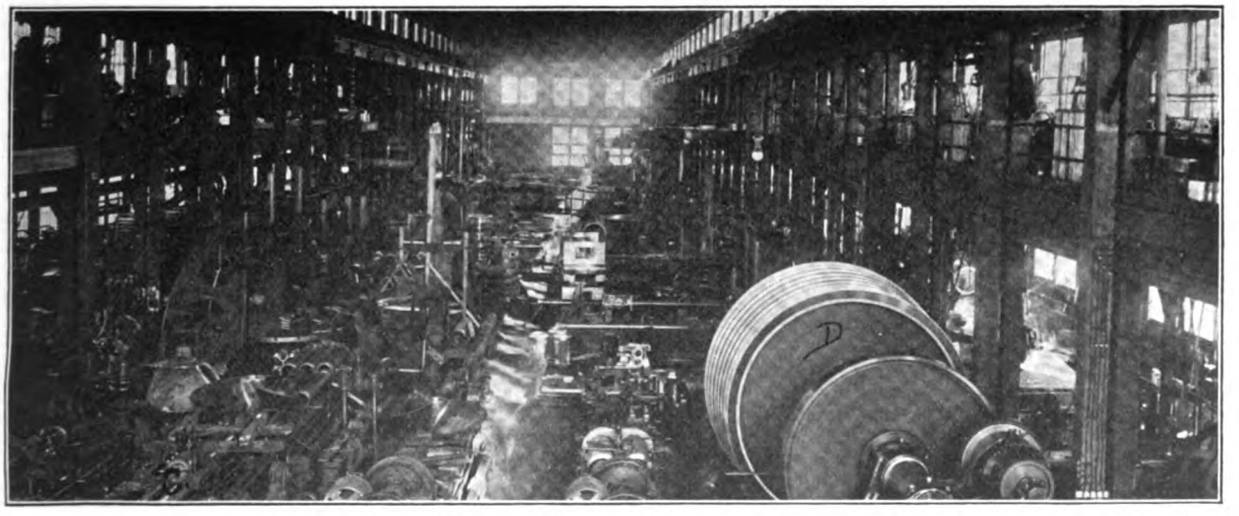
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Laying-out space outside main steel-working shop



The machine shop at Fore River contains some notably heavy tools



Another view of the machine shop, a large turbine working lathe shown in the foreground

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under cover of all materials which go to make up a complete ship has received for the first time the attention which this important service demands.

The corporation also performs miscellaneous work in addition to its shipyard work proper.

The corporation has built and completed, or has under construction during the fourteen years of its existence, 145 vessels, including five battleships, the "Rhode Island," "New Jersey," "Vermont," "North Dakota" for the U. S. Government, and the "Rivadavia" for the Argentine Government, and at present has under construction the battleship "Nevada" for the U. S. Navy. It has built 26 submarines for the U. S. Navy and several for foreign governments. It has built Curtis turbines for the Japanese Navy and for the Italian Navy. Three of the U. S. battleships built at this yard made the trip around the world in 1907 and 1908.

The corporation is at present employing about 4500 men with a weekly payroll averaging $65,000.

Pusey and Jones

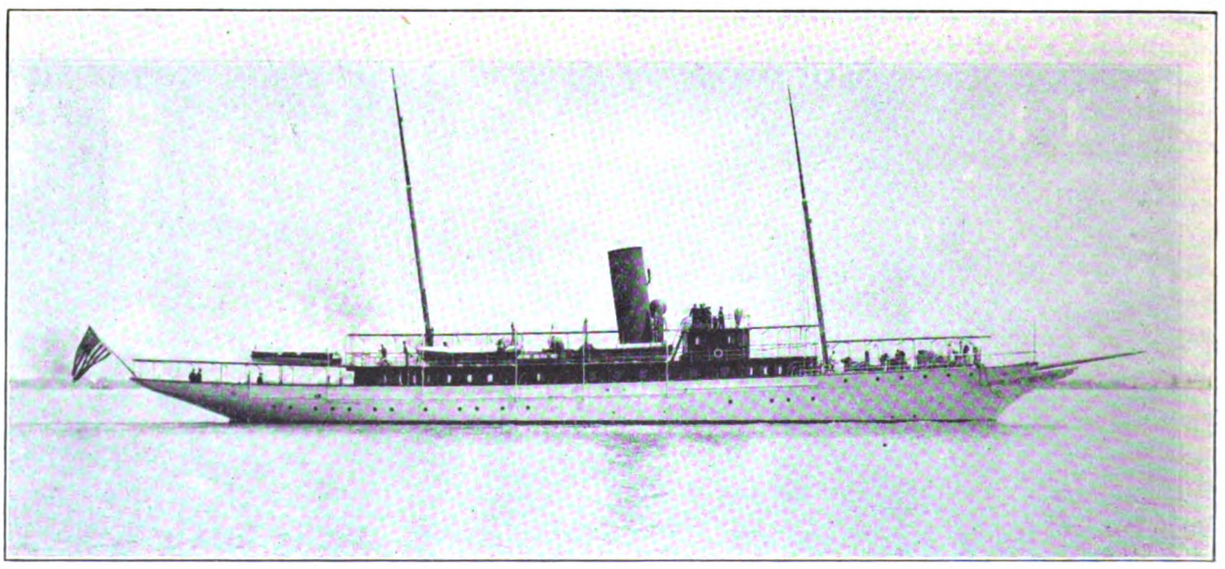
THE Delaware River, serving as a water artery for one of the most important manufacturing districts in the United States, boasts of a larger water borne commerce than any other river in America with the possible exception of the Mississippi. Shipbuilding got an early start on the Delaware and two of the largest concerns in the country, the Wm. Cramp and Sons Ship and Engine Works and the New York Shipbuilding Company, the former an old and the latter a comparatively new yard, launch their new construction into the waters of the Delaware. Aside from these two very large establishments, there are a goodly number of finely equipped yards of smaller capacity in the Delaware Valley and one of these that holds a national reputation as a producer of fine workmanship and high class designing is the plant of Pusey and Jones.

The shipyard and shops of Pusey and Jones are located about thirty miles south of Philadelphia on the bank of the Christiana River about one and a quarter miles from that stream's confluence with the Delaware River. The plant covers an area of about ten acres with 1400 feet of river frontage. The shore side of the property abuts on the main line of the Pennsylvania railroad and an excellent system of spur tracks has been provided.

At the main wharf on the river front is located a 50-ton shear legs facilitating the placing of engines or boilers into a vessel's hull. These shear legs are operated by steam.

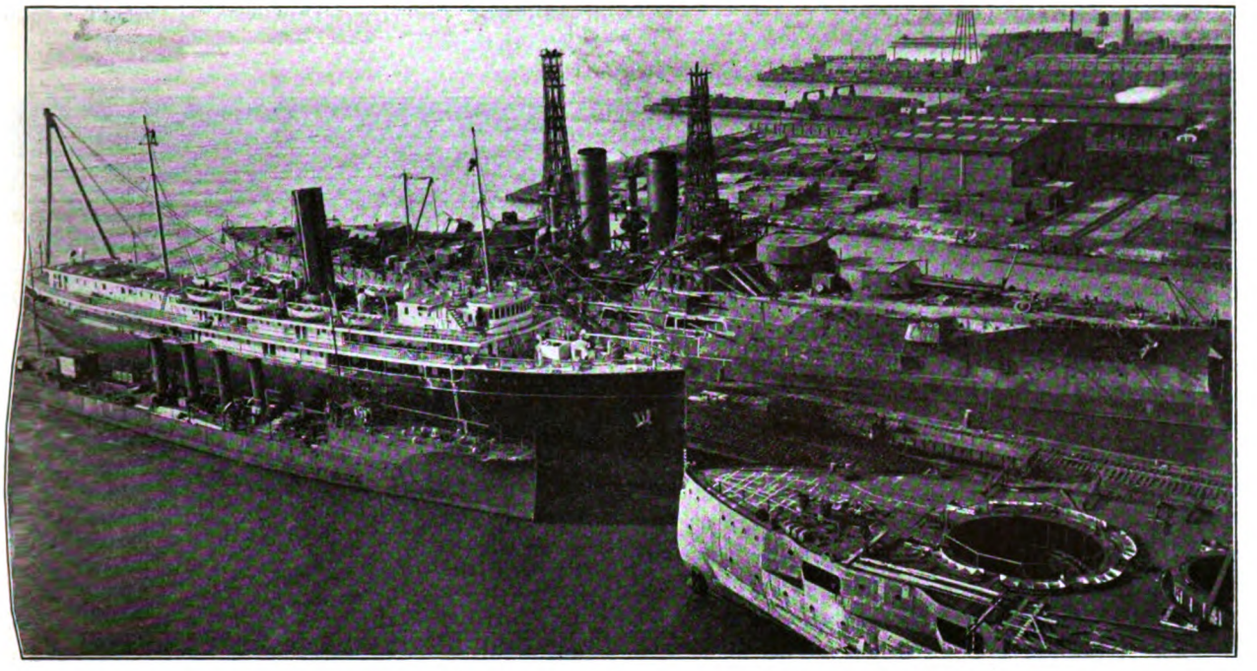
In all about 350 vessels have been built at this yard and the Pusey and Jones plant holds the distinction of having built the first iron sailing vessel constructed in the United States, the "Mahlon Betts." Another notable craft built here was the steel yacht "Volunteer," which successfully defended the "America's Cup" in the international yacht races. The plant is not equipped for building vessels of over 300 feet in length, but within its limits of size it has earned an enviable reputation for turning out high class jobs.

The equipment of the plant is housed in about one dozen structures and these are equipped with powerful tools and machinery of the most modern type. There is also a large oil bending furnace and a marine railway capable of handling vessels 300 feet long.



The steam yacht "Lydonia." This beautiful craft was built at the Pusey and Jones plant, Wilmington, Delaware

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A busy scene at one of the fitting-out wharves

The New York Shipbuilding Company

THIS company was formed by the late Henry G. Morse, in 1899, the first ship being launched in May, 1901.

The plant was laid out with a view to applying, so far as possible, manufacturing methods to the construction of vessels.

To this end, the various shops were arranged compactly together in one continuous building. Each shop is supplied with efficient overhead crane service, and the various cranes are so arranged as to overrun, making the progress of the material continuous, and eliminating man handling.

The wood working and pattern departments are in separate buildings to reduce fire risk.

The mold system of structural work was adopted in the construction of the first vessel and, with very few modifications, has continued in use to the present day, with eminently satisfactory results.

The general arrangement of the plant is well shown by the accompanying plan.

Building "A" is the plate-receiving and distributing shed.

Building "B," boiler shop and drop forge shop on first floor, with light plate shop in gallery.

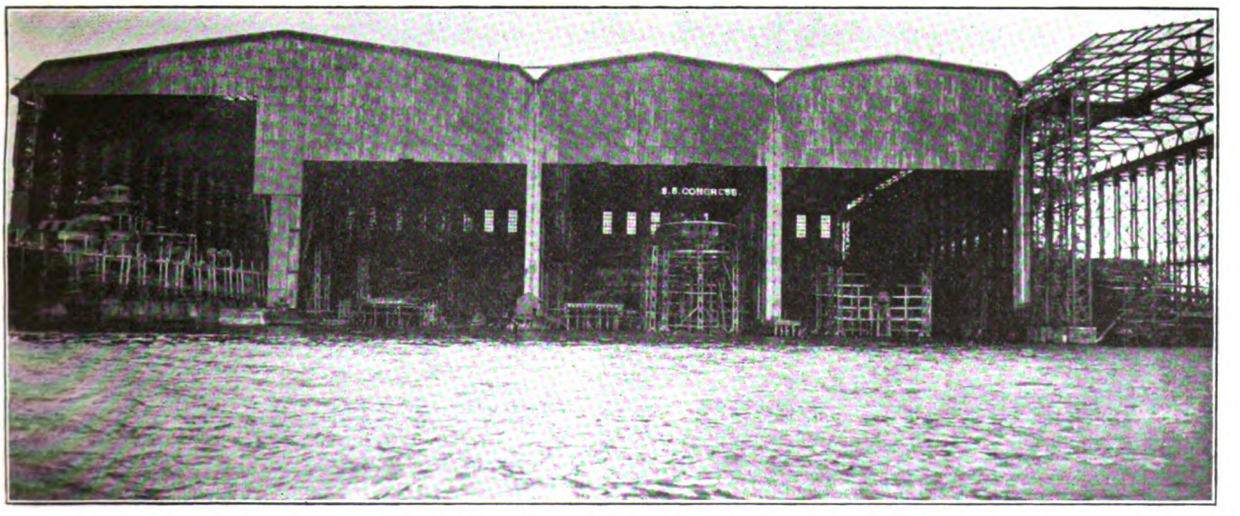
Building "C," angle shop.

Building "D," plate shop on first floor, mold loft on second floor.

Building "E," machine shop on first floor; brass shop, pipe shop, electrical shop and general store room in galleries.

Building "H," fitting out basin or wet slip.

Buildings "J," "K," "L" and "M," building slips.



The covered shipbuilding sheds at the New York Shipbuilding Company. At the left of the picture is shown the covered fitting-out slip

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Building "N," blacksmith shop.

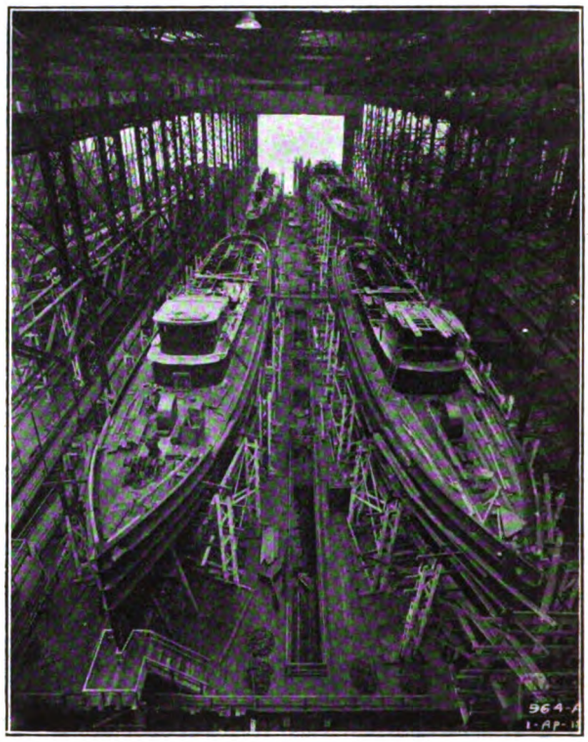
Structural material is received in Building "A," through which it is handled by a gantry crane. This crane is overrun by ordinary traveling cranes in Buildings "B," "C," "D" and "N." From Buildings "C" and "D" fabricated material is carried to the ship ways by low gantries, running under the heads of these ways, which are supported by movable steel girders. The overhead cranes in Buildings "J," "K," "L" and "M" reach the material delivered by the gantries through openings between the vessels under construction. An overhead crane of 100 tons capacity operates over the fitting-out basin, Building "H," and the building slips, Buildings "J," "K," "L" and "M," it being moved from one to the other by a transfer table running along the head of these buildings. By this means, machinery, boilers and other heavy parts are easily placed on board vessels on the ways, and except in the case of very large ships, where the resultant launching pressures would be prohibitive, vessels are practically complete when launched.

The following naval vessels have been built or are under construction by this company:

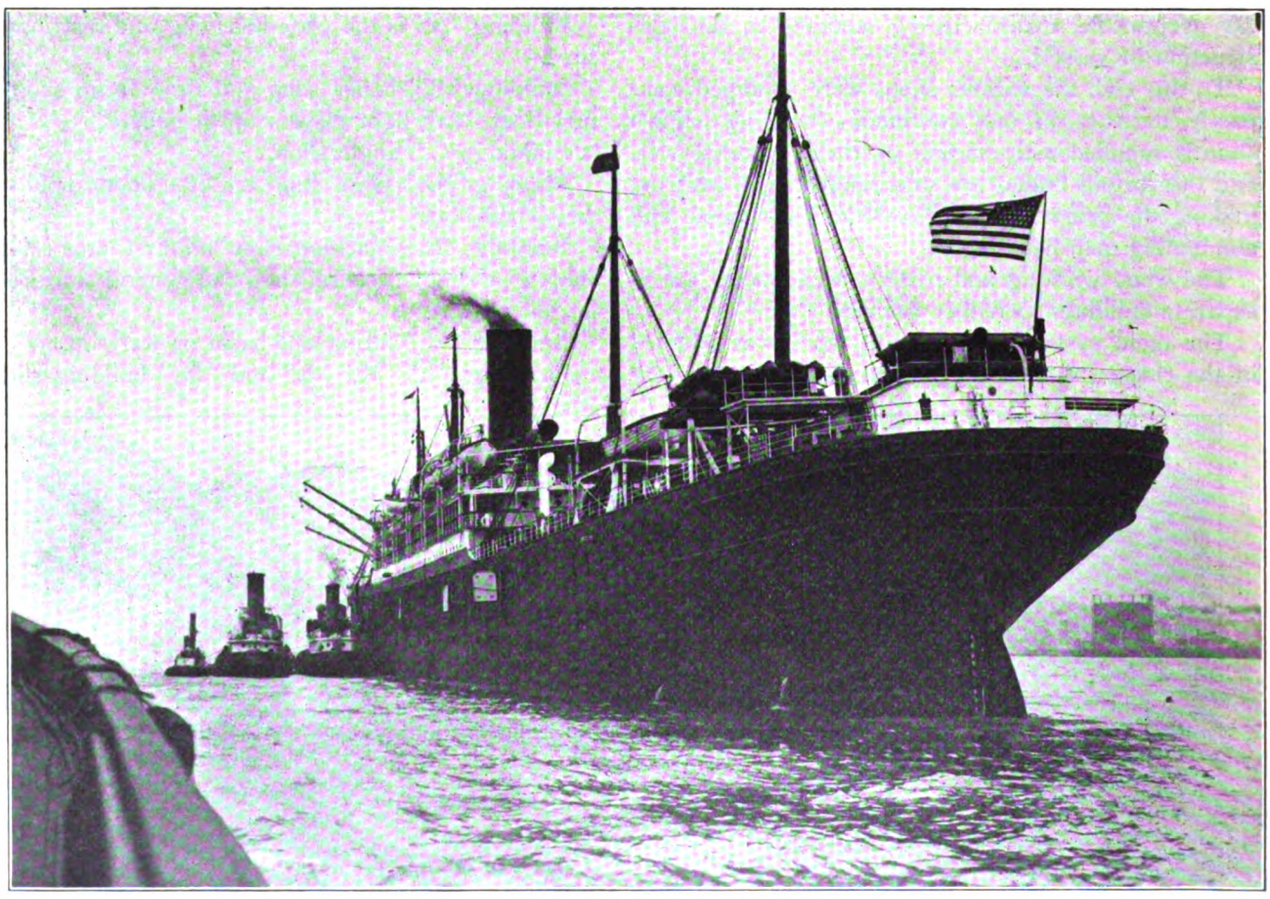
Cruisers: "Washington," "Elli."

Battleships: "Kansas," "New Hampshire," "Michigan," "Utah," "Arkansas," "Moreno," "Oklahoma," "Idaho."

Destroyers: "Preston," "Burrows," "McCall," "Ammen," "Jarvis," "Downes," "Ericsson," "Jones," "Wainwright."

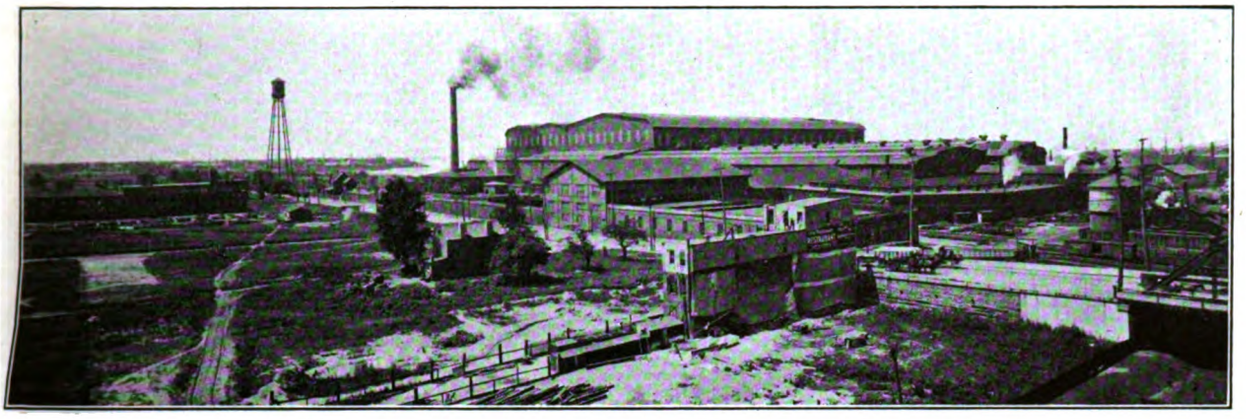


Four small craft building in one slip at the New York Shipbuilding Company's plant

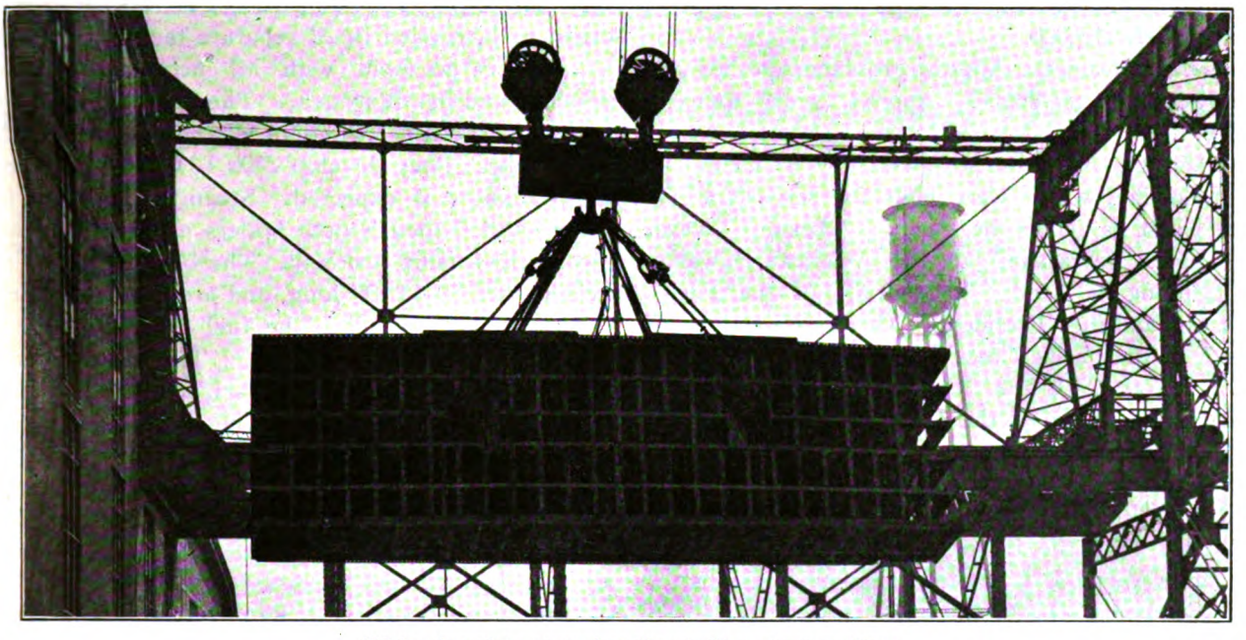


The Pacific Mail Steamship Company's "Mongolia," a product of the New York Shipbuilding Company. This vessel is shown flying the Flag which Congress seems to be determined to remove from the Pacific Ocean

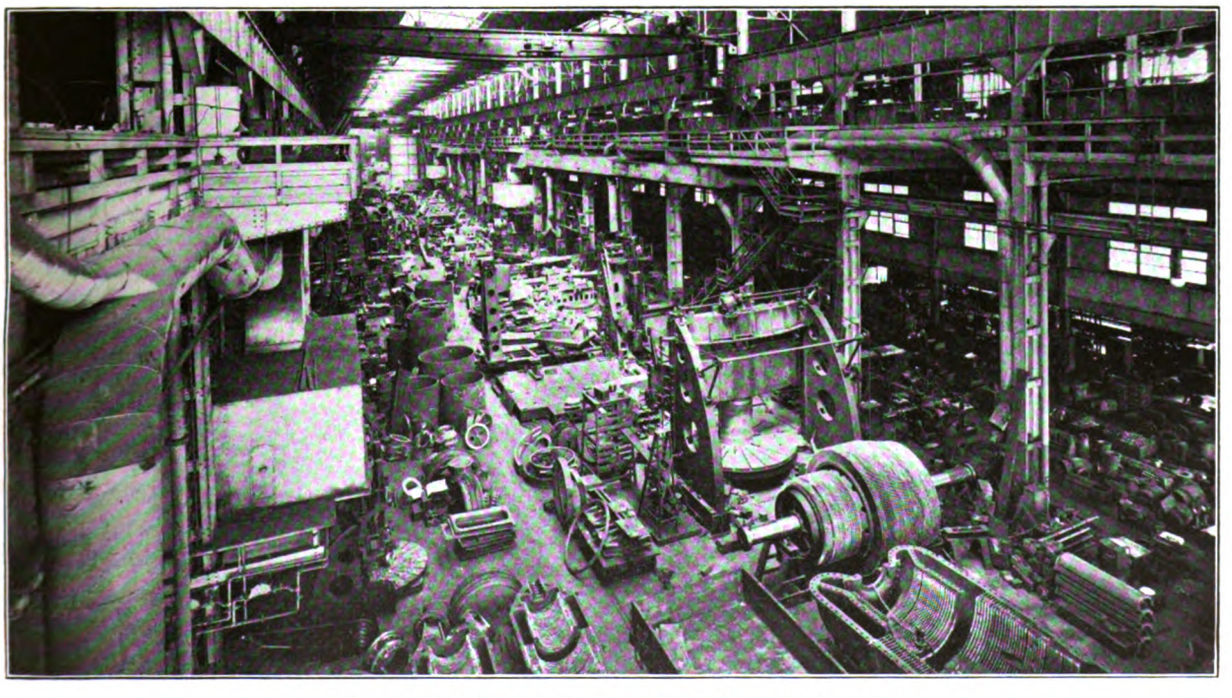
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General view of the New York Shipbuilding Company's plant

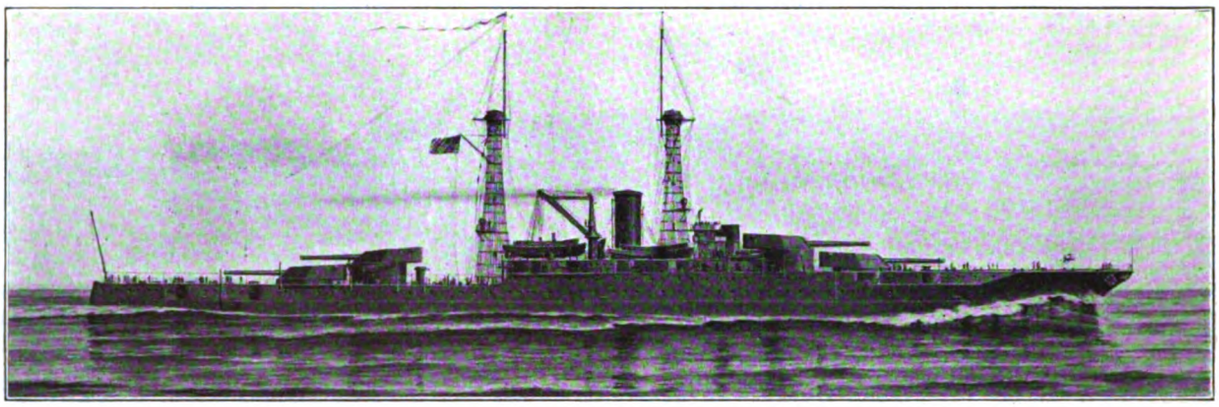


100-ton traveling crane handling built-up tank sections



Interior of machine shop, New York Shipbuilding Company

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The U. S. Dreadnaught "Idaho," now building at the New York Shipbuilding Company

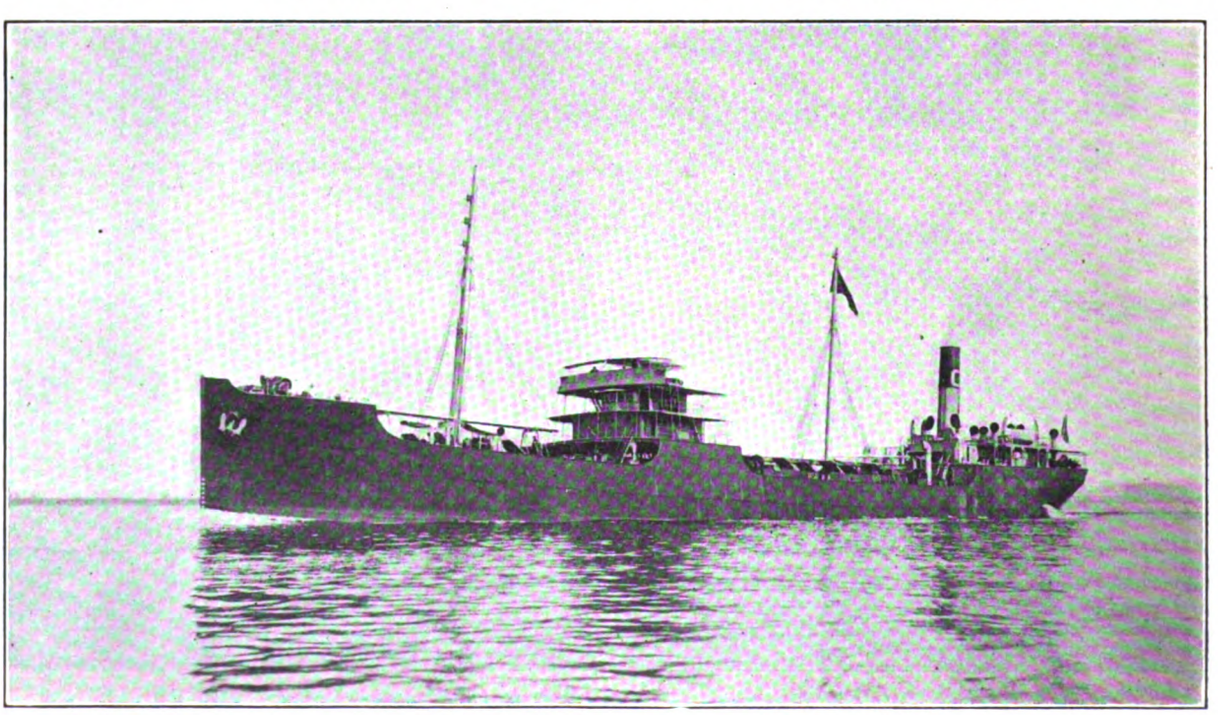
Approx. displacement tonnage, 200,000; approx. horse-power, 275,000.

Merchant steamers: Approx. gross tonnage, 263,000.

Barges and car-floats: Approx. gross tonnage, 63,000.

Among the merchant steamers may be mentioned the following, which were built for service on the West Coast or across the Pacific: "Texan," "Nevadan" and "Nebraskan," of the American-Hawaiian Co.; "Mongolia" and "Manchuria," of the Pacific Mail Co., and the "President," "Governor" and "Congress," of the Pacific Coast Steamship Co.

On March 27th the "Gulfcoast," an oil tanker built to the order of the Gulf Refining Company of Pittsburg, was launched at the yards of the New York Shipbuilding Company, Camden, New Jersey. This vessel is the fourth of the same general class that the builders have constructed for the same owners. The principal dimensions of the "Gulfcoast" are: Length over all 406′ 6″, beam 51′ 0″, molded depth 30′ 3″. She is of the two-deck type with raised poop and quarter deck. She has capacity for 2,285,000 gallons of cargo oil in bulk, carried in 22 separate tanks. There is a large cargo hold with all necessary booms, winches and handling gear. The engines are triple expansion, having cylinders 27″, 45″ and 75″ by 48″ stroke. They develop 2700 I.H.P. and a speed of 11.5 knots is expected. Steam is supplied by three single-ended Scotch boilers arranged abreast in one thwartship fireroom. The boilers are 14′ 8″ in diameter by 11′ 0″ long, and are fitted for burning either coal or oil. The fuel oil tanks have a capacity of 176,000 gallons. There are seven independent cargo pumps each capable of discharging cargo at the same time through different lines. The steering engine is fitted directly on the rudder stock and is worked from the bridge by a telemotor gear. The engine room is supplied with an extensive and complete machine shop and all minor machinery repairs can be taken care of on the vessel herself. A large refrigerating space is provided for stores, and an ice machine of two tons rated capacity per twenty-four hours.



The "Gulfcoast," the latest oil carrier to be turned out by the New York Shipbuilding Company

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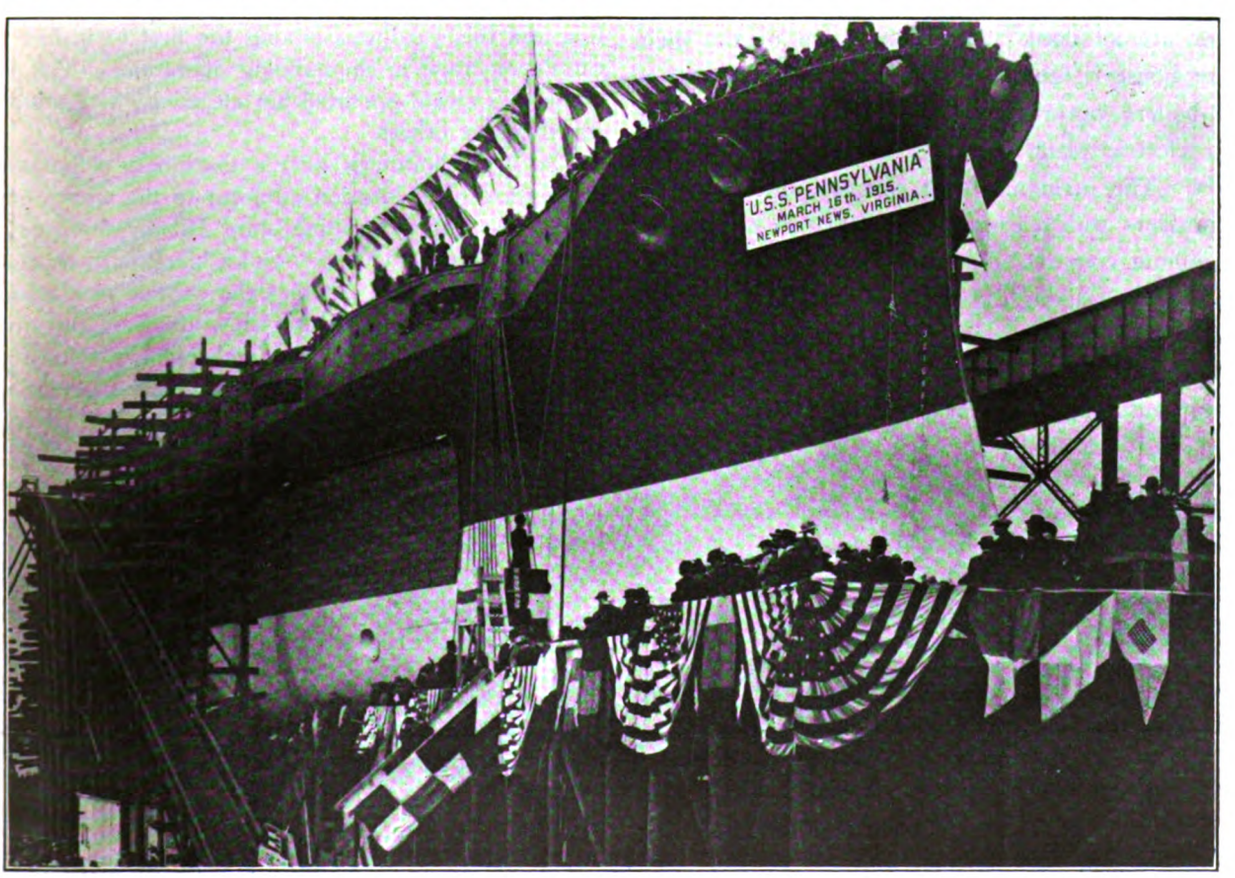


General view of the Newport News Shops

The Newport News Shipbuilding and Dry Dock Company

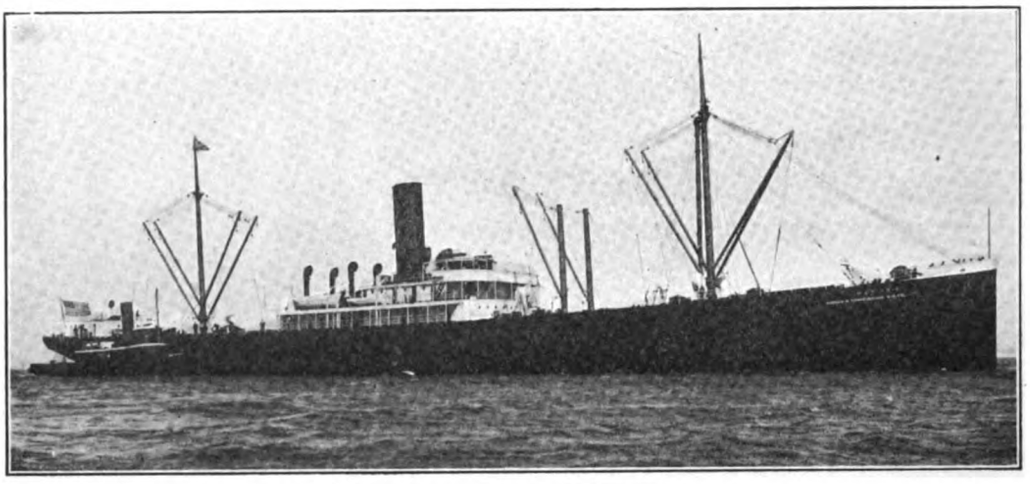
THIS yard was founded by the late Collis P. Huntington in 1890. Newport News presented many advantages as a location for a shipyard such as a plentiful and cheap supply of splendid steaming coal, a very slight tidal variation, which means a great saving in dock construction, and a total absence of ice or very cold weather in winter, and for these reasons Huntington picked this location for his great shipbuilding venture. The plant represents an investment of about $15,000,000 and started out with the advantage of being a completed unit. Up to the founding of the Newport News establishment, most of the other yards in America had been built up from small beginnings and while such a development is rich in experience it is often lacking in unity.

An examination of the accompanying sketch plan of the Newport News shipyard will demonstrate the



Scene at the launching of the U. S. S. "Pennsylvania," Newport News Shipbuilding Company

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The "Neches," another product of the Virginia shipyard

fact that the planning of the yards and shops and their relation to the progression of work and the sequence of operations was carefully carried out. The property of the company consists of about 120 acres with a half mile of water frontage. The buildings, most of which are brick structures, cover about fifteen acres. The network of railroad tracks about the yards and into the shops is connected up with the main line of the Chesapeake and Ohio Railroad. Material is hauled about by the plant's own switch engines on the outside and by steam or electric cranes within the shops themselves.

Steam, electricity, compressed air and hydraulic power are all used. The boiler-room of the main power house is fitted with eight large Scotch marine type boilers working at 120 pounds pressure. The main electric plant furnishes about 3000 K.W. of power. The main air plant consists of three large compressors with a capacity of 9000 feet of free air per minute compressed to about 100 pounds.

Generally speaking the ship shed, framing shed and kindred departments are grouped adjacent to the building slips. The machine, boiler, blacksmith, copper and outfitting shops form another group while the joiner and pattern shops, lumber sheds, fireproofing plant and sawmill are all near each other.

The framing shed, located at the head of the slips, is a large structure 270 by 344 feet in size, contains some very powerful machines, among which is a manhole punch which is capable of punching manholes 27 by 18 inches through metal nearly an inch thick. At each side of the frame shed is a ship shed served by a cantilever crane which can transport its loads to where they can be picked up by the cantilevers serving the building slips. These sheds are respectively 60 by 320 and 72 by 400 feet in size. Among the large machines installed in these sheds are 32-foot bending rolls, guillotine shears, shear blade grinders, cold saws, countersinking machines, 32-foot planers, 16-foot bending rolls and numerous tools of smaller calibre. The mold loft is located on the second floor of one of these buildings.

Adjacent to one of the ship sheds is a bending shed 68 by 128 feet in size. Other buildings directly connected with the group of buildings around the building slips are the ship blacksmith shop 130 by 203 feet in size and a beam shed 70 by 200 feet.

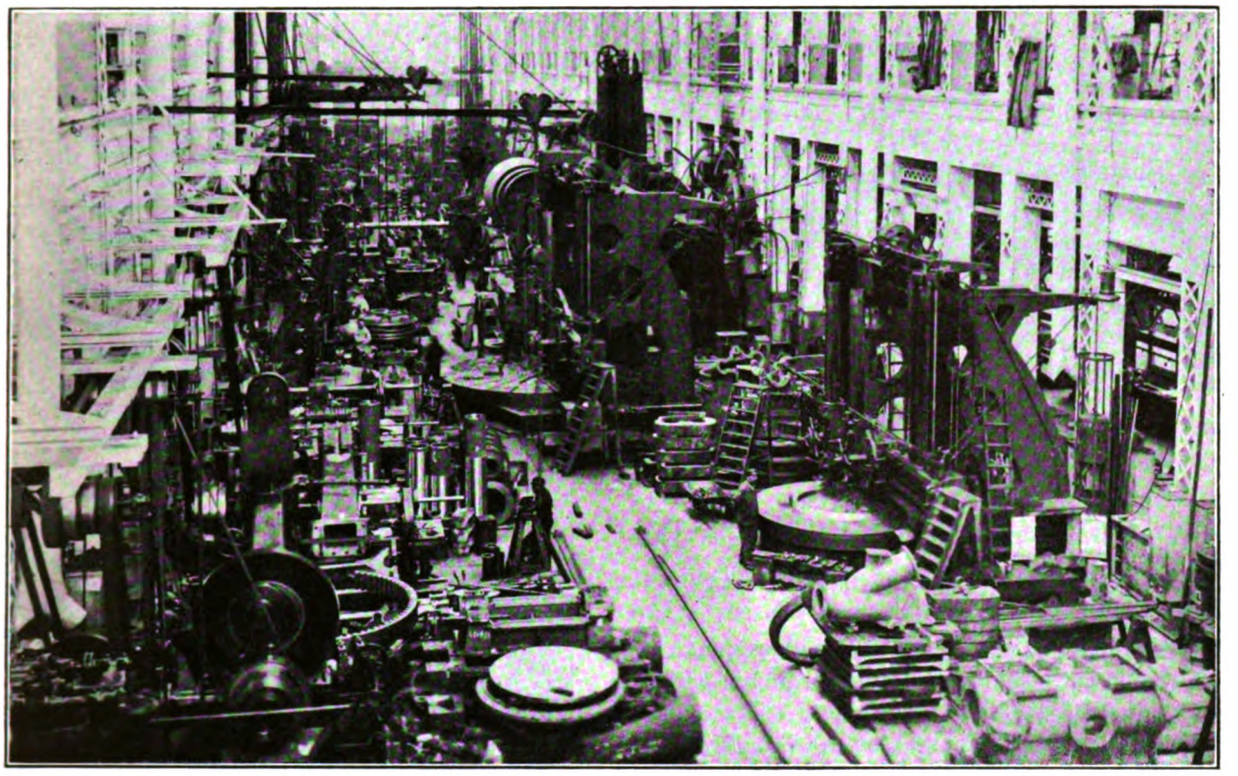
The shipbuilding slips are arranged in pairs with a cantilever crane serving each pair. These cantilevers operate on tramways one hundred feet high. The three cantilevers covering the slips and the two traveling between the frame shed and the ship sheds constitute a splendid overhead system of transportation and this yard was among the first to utilize the cantilever crane in shipbuilding operations. The first crane was steam operated but electricity was adopted for the four others.

The main buildings of the machinery department occupy a central location adjacent to the works office and consist of a machine shop 101 by 560 feet, a boiler shop 103 by 300 feet and a blacksmith shop 100 by 306 feet in size. Among the notable machines in the machine shop are thirty-six-, sixty-, eighty-four- and one hundred and twenty-inch planers, one of the largest wall planers in the world; this machine requires a 50 horse-power motor to drive it. Vertical boring mills, slotters, shapers, lathes, etc., are all represented by some machines of exceptional capacity. The galleries of this shop are largely occupied by brass working machinery. The overhead equipment consists of electric cranes traversing the full length of the building and galleries. The larger of these cranes have a fifty-ton capacity. In the blacksmith shop is located a battery of steam hammers ranging from 600 to 6000 pounds.

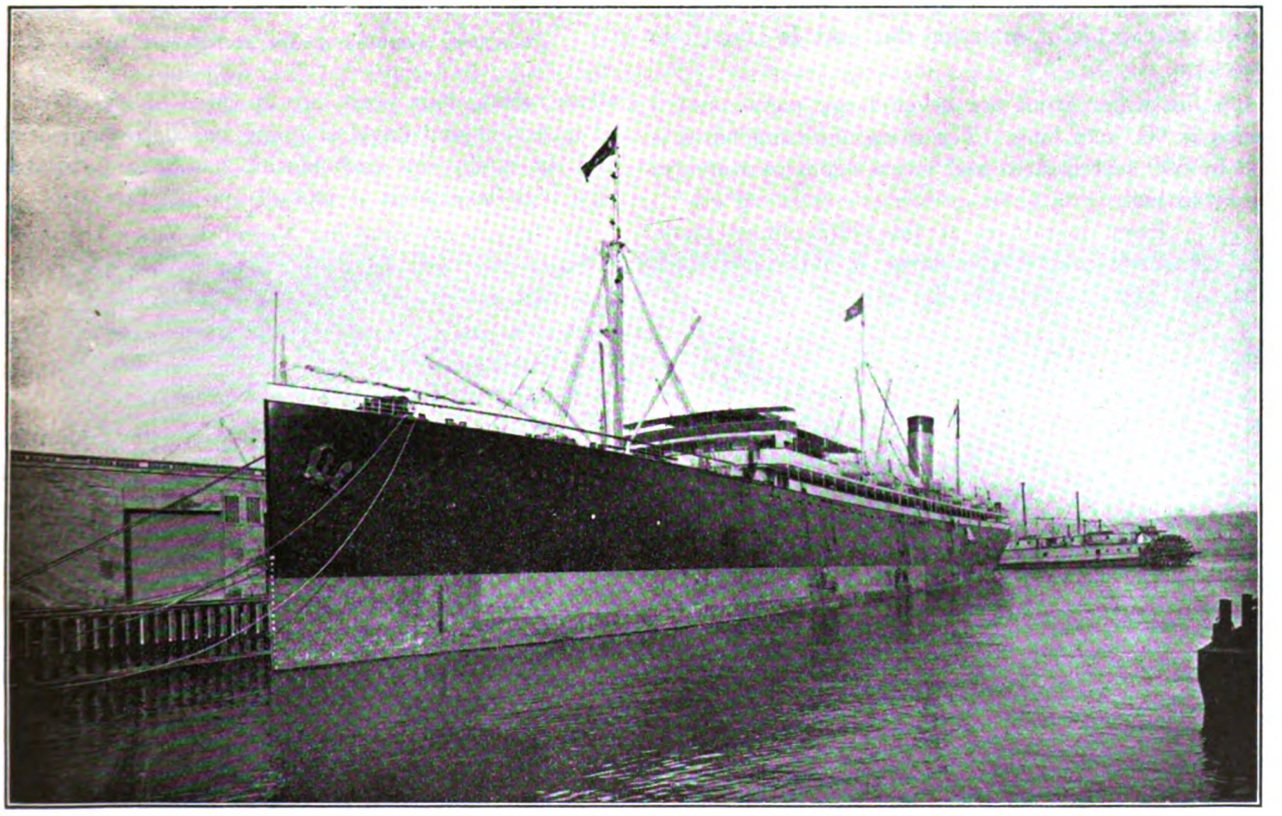
In connection with the two large fitting out basins there is a 150-ton derrick crane served by electric power and operated by one man and shear legs with a capacity of one hundred tons.

The dry docking facilities consist of three timber

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The machine shop at Newport News



The "Matsonia," built at Newport News

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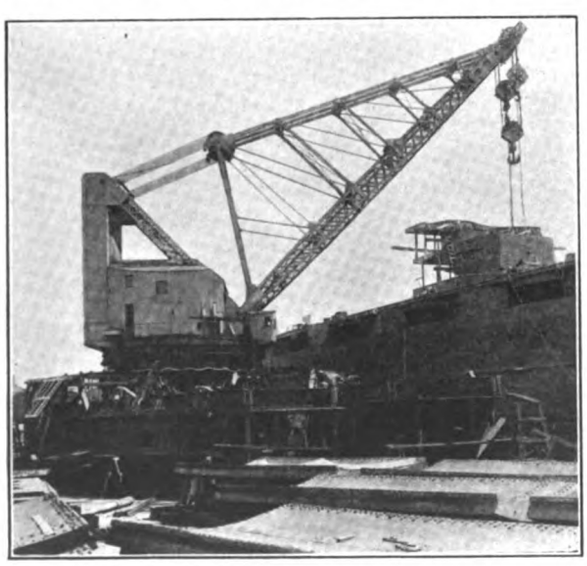
and masonry construction dry docks, the general dimensions of which are as follows:

	Number One	Number two	Number three
Length over all	639 ft.	861 ft.	585 ft.
Length inside	593	804	537
Width top of entrance	94	103	99
Width bottom of entrance	50	84	79
Width top of dock	130	162	147
Width bottom of dock	50	80	62
Height of keel blocks	4	5	4
Depth of water over sill	25	30	24

The largest dock, number two, was designed by former President Walter A. Post, and cost in the neighborhood of $1,000,000. It is built of timber with a masonry entrance, the masonry being constructed on a concrete foundation resting on piles and timber superstructure. The pumping plant was designed by Mr. Charles F. Bailey and consists of two main centrifugal pumps of 100,000 gallons per minute capacity each and one drainage pump with a capacity of 12,000 gallons per minute. The pumps are driven by electric motors of 1000 horse-power each at 500 volts. It requires one hour and thirty minutes to pump out No. 1 dock and 2¼ hours for No. 2. Dry dock No. 3 is provided with an independent pumping plant consisting of one 60″ centrifugal pump and one 18″ centrifugal drainage pump, which are capable of emptying this dock in about two hours.

On the water front are seven large piers, one of which is 900 feet long. The main outfitting basin is 900 by 500 feet in area and has a depth of water of about 40 feet.

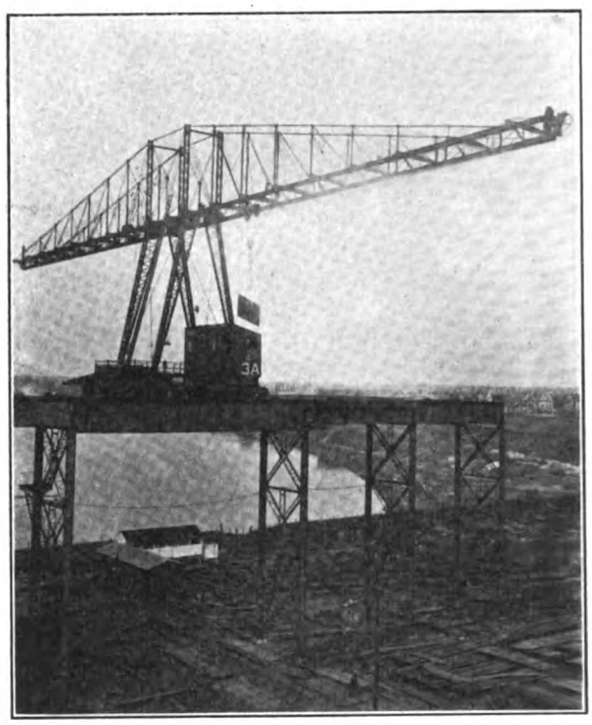
Aside from operations at the shipbuilding plant, this company operates two large foundries, one for steel and iron castings and the other for brass work.



120-ton revolving derrick crane

These foundries are connected directly with the yard by railroad, one of them being only one block away from the shipyard.

The Newport News Shipbuilding and Dry Dock Company does an immense amount of repair work, being splendidly located and equipped for this class of shipyard activity. Since the inception of the plant



The lofty overhead gantry at Newport News

about twenty-four years ago upwards of 500,000 tons of merchant and naval shipping has been turned out and the quality of workmanship has been maintained at a high level both as to hull and machinery.

At the present time the Newport News Shipbuilding and Dry Dock Company is employing about 5000 men and has the following work under way:

One freight steamship for the New York and Porto Rico Steamship Company of the following dimensions: 375′ by 49′ by 30′.

One collier for the Crowell and Thurlow Steamship Company, dimensions 375′ by 49′ by 30′.

Two bulk oil steamers, twin screw, 14,900 tons dead-weight capacity, for the Standard Oil Company of New Jersey, dimensions 516′ by 68′ by 38′.

One freight steamship, 12-knot speed, for Edgar F. Luckenbach, dimensions 425′ by 57′ by 48′.

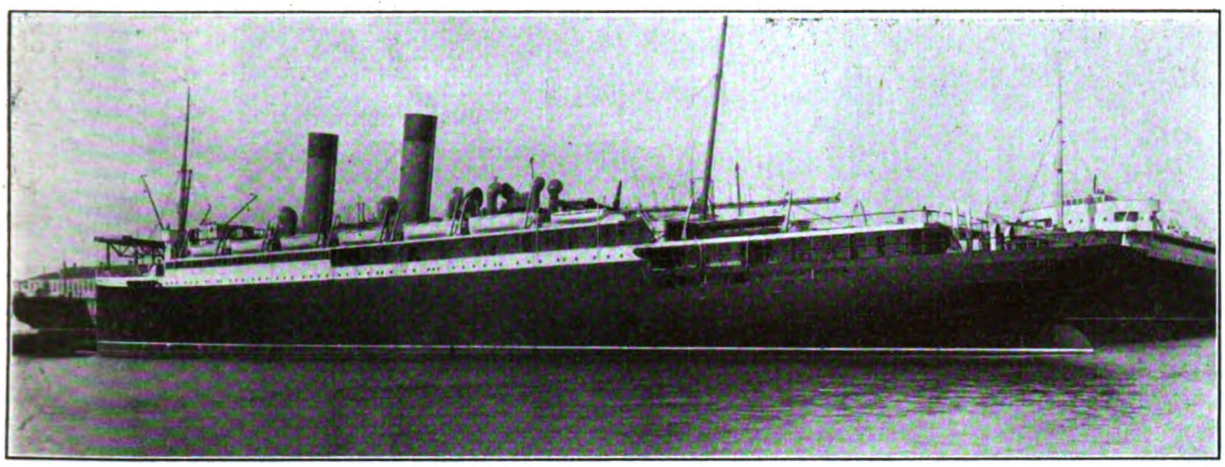
One bulk oil steamer for the Standard Oil Company of New Jersey, dimensions 460′ by 60′ by 36′.

The battleship "Pennsylvania," 31,400 tons displacement.

The battleship "Mississippi," of 32,000 tons displacement.

Revenue cutters numbers 26 and 27 of 835 tons displacement each.

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The "Northern Pacific"

AS far as shipping circles on the Pacific Coast are concerned the recent event of paramount interest, aside from the Seamen's Act, has been the entrance of the steamers "Great Northern" and "Northern Pacific" into the coasting service. These vessels are 524′ 0″ over all, 500′ 0″ between perpendiculars, 63′ 0″ beam, 25,000 shaft horsepower, made a fraction over 24 knots speed on trial and carry 550 first class, 108 second class and 198 third class passengers. A description of the passenger accommodations of these vessels appeared in the March "Pacific Marine Review."

Among the interesting things in connection with these boats is the extensive use of Nevasplit paneling. This paneling is 7/16″ thick and was supplied by the Keyes Products Company of New York. "Nevasplit" being light, durable, strong and non-absorbent, has met with much favor from naval architects and shipbuilders, especially as ceilings, and the ceilings in the bachelor quarters on these two finely finished vessels is illustrative of the splendid results that can be obtained with Nevasplit.

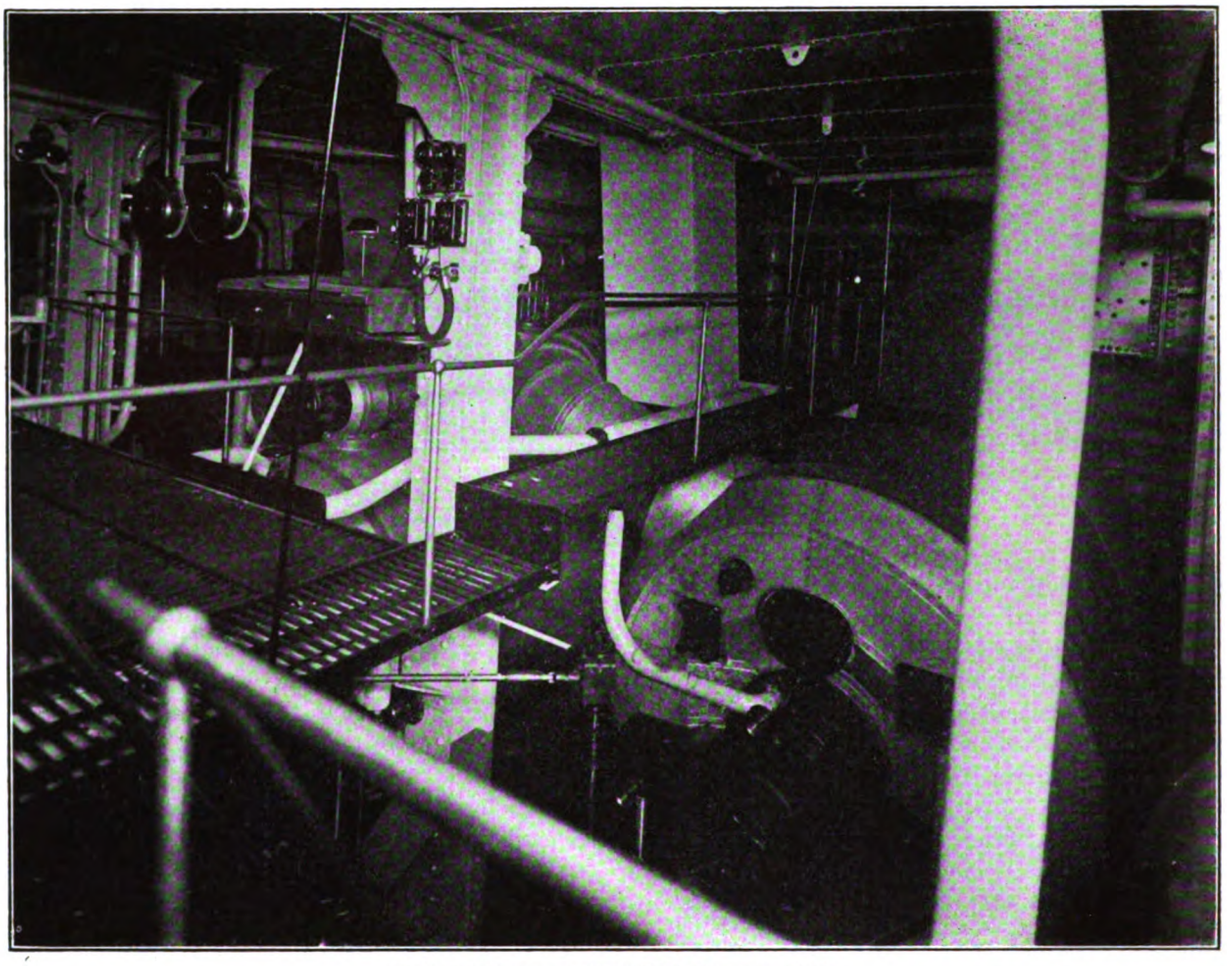
Another article that has been lavishly used is Dreadnought flooring. In fact, almost the entire shelter deck outside the staterooms is laid in Dreadnought, and bath rooms, toilets, etc., are all covered with the same well known flooring.

The steering gears on the "Great Northern" and "Northern Pacific" are of the Williamson differential type with cylinders 14″ in diameter by 14″ stroke. This differential type steering gear serves the double purpose in saving steam consumption by the steering engine and obtaining a differential leverage, increasing as the rudder is moved away from its amidship position into areas of greater resistance to the water, the differential link connection between the rudder head and quadrant giving



The dining-room in the "Northern Pacific"

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In the engine-room of the "Northern Pacific"

more power as the rudder approaches the hardover position and less power and quicker action with the rudder amidship. Consequently, the ship responds more quickly to the helm. This steering engine is controlled from the pilot house by the Williamson pilot house type of telemotor. There is also a hand screw emergency steering gear fitted on each of these vessels for use in case the steam steering gear is out of commission.

The windlass is of the "Providence" spur geared type and has 10x10" double cylinder reversing engines and wildcats suitable for handling 2½" studlink cabin. This spur geared type of windlass is much more efficient than the worm-geared type and greater speed and power can be obtained for handling the anchor chain even with a smaller engine. By placing the warping head on the auxiliary shaft, a much greater speed is obtained for warping ship than in the worm-geared type of windlass where the warping heads are on the end of the wildcat shaft. This is a very desirable feature.

For handling freight and operating the booms, each ship is equipped with four double cylinder, single drum spur geared, reverse valve hoisting engines with cylinders 8" in diameter by 10" stroke. Each hoist is equipped with one 15" gypsy head. These hoists are arranged in pairs with right and left hand operation, so that one operator can control two hoists.

On the boat deck, aft of the pilot house, is located a hoisting engine with shaft extending across the deck. On each end of the shaft is mounted a double winch head for handling the rope used in lowering or raising the ship's boats. These hoists are of the double cylinder spur-geared type with reverse valve engines, having cylinders 8" diameter by 10" stroke. These hoists are not fitted with a rope drum.

There are four dock type steam gypsys with gypsy barrels 16" in diameter at the smallest part, operated by 8x8" double cylinder, non-reversing engines through worm gearing, making very powerful machines.

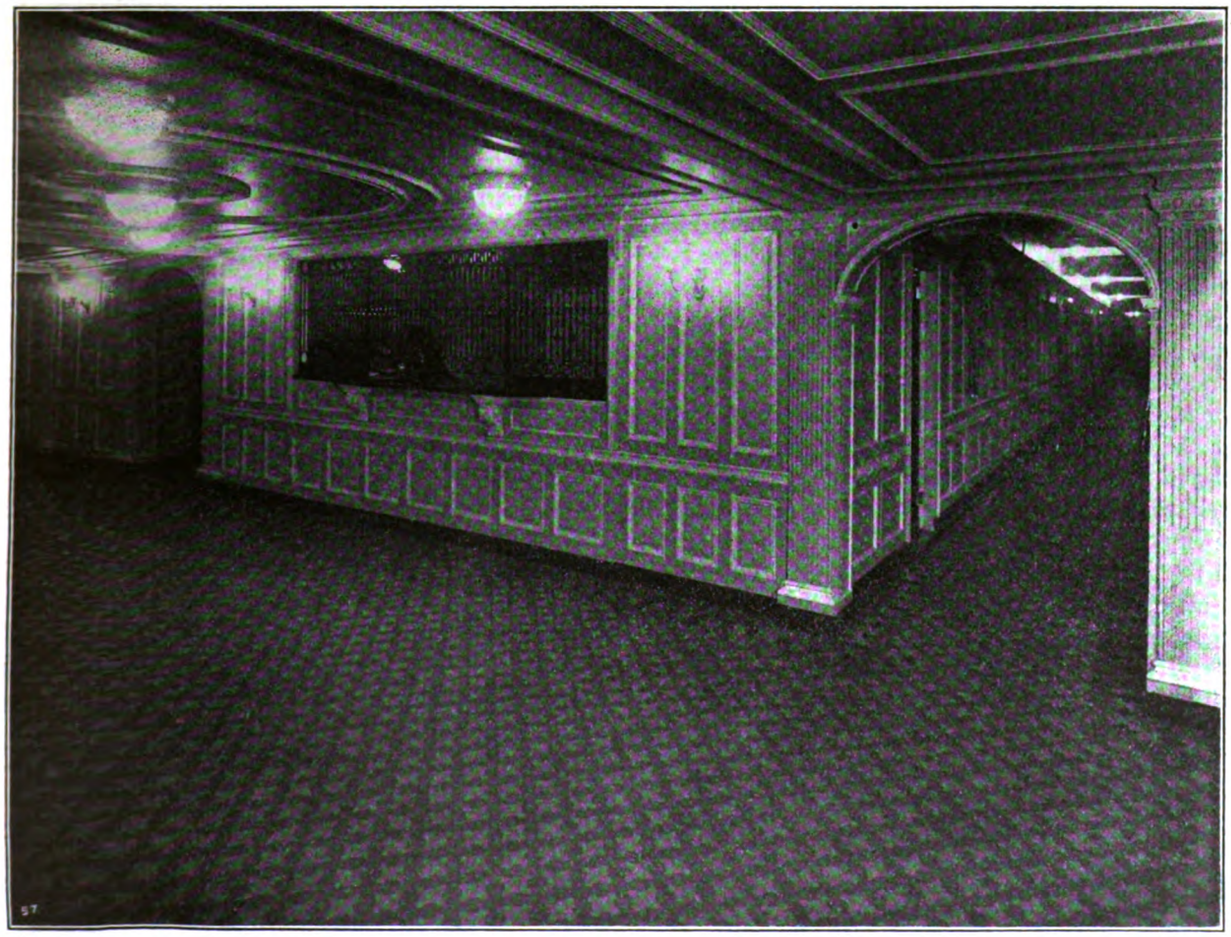
There are four 40 H.P. electric elevator hoists having single drums and being compound geared to give a capacity of 13,000 pounds at 100 feet per minute through a two-part purchase. The motor is compound wound for 110 volts direct current, of the semi-enclosed type fitted with standard solenoid brake.

The hoist is also equipped with a traveling cam limit switch, so designed as to stop the elevator at the limit of travel. The motors are operated through a drum controller and contactor panel, designed for a variation of speed of 50 per cent. below normal.

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A corner in the lounge, S. S. "Northern Pacific"



The purser's office, showing the use of Dreadnought tiling and Nevasplit paneling overhead

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Origin, Development and Effect of Water Transportation

Address Delivered by J. S. Hines on Shipowners' Day at the Panama-Pacific International Exposition

COMMERCE has advanced hand in hand with civilization from the earliest times, having commenced as soon as mankind became able to produce a surplus over and above what was necessary to sustain life. Trade routes followed natural channels, land or water, from one center of population to another, but even at the very dawn of history the ship held the advantage which she still holds to-day, that of the primiere conveyor of heavy freights. The Greek and Roman historians and statesmen were unanimous as to the vital importance of maintaining their sea supremacy and it is certainly no perversion of self-evident facts to say that each of the great nations that rose to the summit of earthly power and influence made its ascent through becoming master of the sea and lost its proud position through slackening its grip upon the ocean.

Roughly speaking, the history of trade and trade routes divides itself into five periods. From the earliest known times to the close of the fifth century and the downfall of the Western Roman Empire may be treated as the first great division of travel and trade. There was no avenue of entrance from Asia to Europe except at the southern end of the Ural mountains and the Huns, pouring through this break in the great mountain barrier, swept westward over southern and central Europe and founded Venice, which became the first great trading state, in the modern sense of the term. Alexandria, the Bosphorous and the Levant ports on the Mediterranean were the ends of the trail for the great caravans bound from the East to Europe, and here the rich goods of Asia and the Indies were transshipped into the sturdy vessels of the nation whose rulers happened to be wise enough to gather in the golden harvest that goes with the control of the carrying trade of the sea. It has often been asserted that the desire of western Europe to secure possession of the great terminal ports of the overland routes to Cathay had fully as much to do with the crusades as any religious sentiment.

The second period in the history of trade routes covers practically one thousand years, or down to the discovery of America and the Cape of Good Hope route to India. The Venetian states maintained a wonderful supremacy throughout a great portion of this long period. During the twelfth and thirteenth centuries, Venice became the great exchange mart and the center of the carrying trade of Europe. Trade followed a regular cycle much after the manner of the European, North American, South American triangle on the North Atlantic to-day. Venetian ships carried sugar to London, from whence they sailed with wool to Flanders, at Flanders the wool was exchanged for cloth, the cloth was distributed at the various ports en route to the Levant and the ports at the eastern end of the Mediterranean Sea furnished return cargoes. With the discovery of a new world and a new route to India and the East Indies around the southern end of Africa, Venice was no longer the center of the world and the seat of the greatest activity passed to Amsterdam, Antwerp and London.

The third period extends from 1500 to 1776. These years were marked by the rise and failure of Spain and Portugal and the misfortunes of Holland. Towards the close of the seventeenth century, Holland was firmly established as the business, banking and industrial center of Europe. Money was so plentiful that interest charges went as low as three per cent. while remaining about eight per cent. in all other countries. The shipping laws of 1651 ruined the Dutch foreign trade merchant marine, however, and it is noteworthy, as in the case of Spain and Portugal, that even Holland's wealth and manufacturing supremacy could not offset the fact that all her goods had to be shipped in English bottoms.

The fourth period, from 1776 to 1860, was the period of steam. Indeed this period might well be called the period of Great Britain, for while Europe was in an almost continuous turmoil of political and social unrest, England became the workshop of the world, she allowed raw materials to be imported free and thus exacted a tremendous tribute from the labor of the entire world. James Watt perfected the steam engine, the Stevensons worked up the locomotive, space was annihilated, new countries were opened up and new trade routes sprang into existence. Staple commodities of all classes dropped materially in price due to labor saving in production and transportation, wealth accumulated and the peoples of all nations had greater surpluses to expend on imports. By upbuilding a mighty foreign trade merchant marine which operated under favorable conditions and laws, England gathered wealth from every corner of the earth and became the greatest leading nation in the world. A thriving young democracy was also brought into existence during this period and even in its infancy this new nation

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filled England with consternation on account of its rapid strides towards a highly important position as a user of the trades routes of the world. American ships were everywhere, American skill and business acumen generally brought home the bacon and English owners even came to the point where they were ordering a large percentage of their new tonnage from American ship yards. This condition was very short lived. Politics took a hand and political stupidity was set up against statesmanship and failed miserably, the United States losing all but a mere fragment of her once proud position on the great sea routes of the world.

The last period brings us down from 1860 to the present day. There has been tremendous developments in trade and trade routes along two distinct lines during this period. The art of communication has been immeasurably advanced by the telegraph, cable and wireless. This, of course, is of incalculable benefit to the ships that traveled the great trade routes as well as to owners, shippers and consignees. The other and greater development has been the opening up of two new routes: one east, the other west; one the Suez canal and the other our own Panama Canal. The Suez canal brought India, China, the East Indies and Oceanica thousands of miles nearer to Europe, and the Panama Canal does exactly the same thing. Choice between the two routes must often lie with trade possibilities along the route rather than any differences in distance. This fact should be driven home to every American. Those of us who dwell along the shores of the Pacific can see wonderful possibilities in the great new world route which the enterprise and money of our nation has thrown open to the world, but these possibilities can only be changed to realities through an earnest desire on the part of our people to benefit by them. At one time our nation stood ready to receive Neptune's sceptre as the mistress of the seas, but our opportunity was ruthlessly shoved aside. Let us hope that our second great opportunity to assume a dignified standing upon the ocean commensurate with our wealth and power will not be utterly thrown away.

The Panama-Pacific International Exposition will have more than justified the work and money expended upon it if it accomplishes nothing else aside from educating a goodly number of our inland citizens as to the meaning, possibilities and latent wealth and power wrapped up in the proper use of the great sea lanes which have made and unmade nations in the past and which shall continue to make and unmake nations till the end of the world.

Seamen's Act to Have Stormy Career

The question which naturally arises regarding the desertion and language clauses of the Seamen's Act is, "How will other nations receive a measure which utterly changes the present day code of the sea and dictates onerous terms to foreign vessels in American waters?" It is evident that this long wrangled over yet woefully impracticable bit of legislation is going to meet with a warm reception among the maritime nations of the world. The following editorial from "Shipbuilding and Shipping Record," an English periodical, is probably as mild an arraignment of the Act as we will see in the foreign press, for as time goes by and the full significance of the measure becomes apparent there will be a bitter call for retaliation among the nations of Europe:

"The American Seamen's bill drafted by the Sailors' Union has received the President's signature, and is on the way to become a law. The bill was passed in the face of formal protests made by the British Ambassador on behalf of British shipowners whom the measure will hit very hard should it ever be allowed to be enforced in its present shape. Substantially, the bill gives any member of the crew of a foreign ship calling at an American port the right to demand half of his earned wages and allows him full liberty to desert. This, of course, is in contravention of all existing Consular conventions, but provision is made for this by calling upon the Government to denounce all treaties to the contrary. The bill—or rather Seamen's Act, as it should now be called—compels all ships carrying passengers sailing from an American port to carry a crew a large percentage of which understands the language of the officers. This clause is the most pernicious of the whole measure. It also reveals the power behind it. The Sailors' Union enjoys no power whatever on the Atlantic coast, but on the Pacific it is supreme, and it was the heads of the Union, who all originate from the Pacific, who insisted on the language test in order to compel American Transpacific boats to carry white seamen. To the shipping trade of Great Britain this clause, if enforced would mean doing away with Lascars and Chinese seamen, if it is contemplated to carry passengers from American ports. Nor is this all. Upon arrival at any American port the Union delegate would come on board ship and instruct the crew as to their 'rights.' The sequence would probably be that all the men would walk ashore and the Union would provide substitutes at the rate of wages ruling at that port at the moment. The Seamen's Act is one of the most vicious measures ever passed. It will make trading with American ports a matter of endless difficulties, unless the nations whose treaties are to be denounced to allow of the provisions of the Act becoming a law resolutely oppose any attempt to enable the American Seamen's Union to dictate how they shall run their ships."

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"'Tis an Ill Wind," Etc.

NOW it happened in the days when our broad land was under the dominion of he who was known as the mighty schoolmaster that the nations of the old world fell into a conflict one against the other, and the smoke and roar of battle filled the firmament with plaster dust and brimstone, and the publicans and long jaws of our beloved nation met in the halls of legislation where laws and pensions are dispersed with liberality and effusiveness. And they said unto each other, the goods of our people are piled high upon the docks of our coasts and the people are clamorous because there are no monsters of the mighty deep to cart away the fruit, grain, powder, shot, mules and other edibles that those who are in conflict would gladly consume. Therefore let us invite the great ships of other peoples to come in and be one with us. And as it was said, so it was ordered, and divers ships and boats and tubs and rafts and scows came within our gates and carried away our cotton and our grains. Our merchant marine after, lo, these many years began to creep upwards in the eyes of the world. Now when the publicans saw that the ships of our nation which ventured across the great waters were increasing, they pondered among themselves and said: "Lo, there must be a nubian in the neighborhood of the woodpile, and this increase whispereth loudly of deceit and flimflam; therefore let us put a noose around the neck of the shipowner that he become more humble."

Now it came to pass that such language sounded like music to the ears of the legislators, for of a verity they had been kicking the money gatherers so long that their toes itched for want of their accustomed diversion. So they girt up their loins and delivered the shipping a mighty blow and labeled the same safety of life at sea. And the owners were a-weary and said let us die in peace. But the legislators were obdurate and cried with one accord: "For two score and ten years ye have refused to flog your sailors and ye told us naught about this omission, therefore ye have deceived us and the law which we now pass has made of us a laughing stock before all nations, and revenge is dear to our hearts. And we did decree that a sailor should have one ounce of butter each day and ye have given him six, and this excess has caused him to become as one who hath consumed much liquor, for his feet have slidden on account of the oleomargarine ye have instilled into his system. Ye have also furnished him more water than the law alloweth, and fresh water is highly offensive to an old salt."

But the shipowner shook his head gravely and shook the dust of Washington from the skirts of his garment and departed, saying unto himself: "Isn't it great to be an American?" And he took his ships and hoisted the flags of various nations over their sterns, so that the American foreign trade merchant marine was scattered from Dan to Beersheba. And after many moons those nations that slew each other grew weary and patched up a peace, and said unto each other, we have fought long and valiantly and our simoleons are scattered and gone; therefore let us turn once more towards our Uncle Samuel and extract as many of the iron men out of his pockets as may be. And once more were our harbors filled with the ships of our neighbors, and they sailed away with our freight and our dollars, and they leaned shoulder to shoulder and whispered one to the other: "The American goose that layeth the golden eggs is breaking all her former records; so let us rejoice with our good friends Laugh a Lot and Andy Forsooth."

You Poor Fool Editor:—

I have watched your fight against the passage of the Seamen's bill with great amusement. I knew all the while that you had no chance against Senator La Follette. That man is too deeply steeped in the salt sea lore of his native state, too familiar with the hardihood of the sailor's life and also too proud of his record as the destroyer of the unholy tenets of big business for such a negligible whipper-snapper as you to influence. However, "Live and learn" is my motto and no doubt you are now beginning to see the great refulgent light that is beaming up out of Wisconsin to illuminate the world, make the crooked places straight, the dark places light and the orange patches yellow. When the names of Lincoln, Washington, Franklin, Caesar, Demosthenes, Martin Luther, Saint Augustine and Ty Cobb are forgotten, the name of La Follette will still be traced in letters of gold across the firmament of human righteousness, his statues will adorn our parks, his bust will win the most cherished niche in the hall of fame and La Follette cigarettes will hang limply between the lips of the indolent youth of our broad land. I was tempted to be harsh with you, but profound pity causes me to let you off lightly. If you wish information on any other subject, I will gladly furnish it.

Yours without a struggle.

JASPER O. KNUDSEN.

Statistics recently received from the British Admiralty show that the total number of German vessels now detained at neutral ports is 707, of which 593 are steamers and 114 sailing vessels. Vessels captured at sea, according to the report, numbered 77; those captured in German colonial ports, 26; and those seized when entering British ports, 26. Seventy-one British vessels were detained at German ports at the outbreak of the war.

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WOEFUL IGNORANCE.

In La Follette's Weekly, under the caption of "The Sailor a Free Man," appears the following:

"It is four days since the President signed the Seamen's bill, and already the masters of the sea are beginning to threaten dire vengeance. Through their press they are turning out columns of violent denunciation of the law. Already they are giving warning that they will cancel their American registry. The Pacific Mail and the Dollar line to the Orient, it is announced, will sail under the Chinese flag. This law was made for just such patriots as the owners of the Pacific Mail and Dollar line. With the American flag at the masthead they now man their vessels with underpaid, underfed Chinese with whom the owners have displaced American seamen.

"Under the new law, however, when they enter an American port, even though they fly the Chinese flag, they will become amenable to the Act. Their John Chinaman sailors will soon learn that they can demand their half pay and the right to quit unless paid the going wage for American sailors in an American port. They will receive the higher wage when they sail out of any port of the United States, no matter where they are registered, no matter what flag they fly."

Senator La Follette was the champion of the Seamen's bill, and, therefore, La Follette's Weekly should know just what it is talking about when it discusses the new Seamen's Act. We cannot accept the viewpoint of La Follette's Weekly, but we are forced to admire its frankness. It is the first publication of any kind on the sailors' side of the controversy that has come out flat-footed with the assertion that the one and only reason for the Seamen's Act was to increase the sailors' wages and, incidentally, the powers of their union. Nor does La Follette's Weekly stop here in its burst of candor. We cannot bring ourselves to believe that a weekly paper of the standing of La Follette's is ignorant of the fact that a Chinese Exclusion Act exists in this country, and since it is stated authoritatively that Chinese crews are to desert wholesale in order to enforce their demands for American pay, are we to understand that the Chinese Exclusion Act is to be abrogated in order to make the Seamen's Act fully effective?

CERTIFICATED LIFEBOAT MEN.

We are given to understand that aside from any general raise of wages contemplated by the framers of the Seamen's Act, that the certificated lifeboat man's scale is to be placed at $15 per month over and above his regular union scale of wages. In an ordinary coasting steamer carrying ten lifeboats this means that twenty of the crew will have to receive a bonus of $15 per month, or $300 per month will be added to the wage account of the vessel. What proportion of these twenty men will be picked from the present crew of a vessel and how many will be extras over and above the number of men in the present crew rests entirely with the unions whose members are involved.

CONTRADICTIONS IN THE SEAMEN'S ACT.

Since the new Seamen's Act has been published and its text is available for general distribution among the people, it appears that the language of most of the clauses embodied in the Act is hazy and contradictory, and that legislation has been enacted, after two years of discussion on the floor and in committees, that is bristling with double and even triple interpretations.

In the matter of manning the lifeboats a certain number of "certificated lifeboat men" are specified for each boat, depending of course on the capacity of the boat; then again, "A licensed officer or able-seaman shall be placed in charge of each boat or pontoon raft." Neither the licensed officer nor the able-seaman is necessarily a certificated lifeboat man and may not know the difference between an oar and a bale of hay, and yet he is placed in charge of a lifeboat crew which presumably does know something about handling the boat. In any community where the various classes of help on board a steamer, such as sailors, stewards and firemen, are all strongly unionized, the certificated lifeboat men clause of the Seamen's Act becomes an exceedingly effective weapon to be used as a club to increase wages. On the Pacific Coast the unions which control the employees on shipboard are affiliated, and by means of a little manipulation the certificates can be made to serve a far different purpose than that contemplated by the legislators at Washington. Suppose that the firemen's union and the waiters' union agreed to keep hands off the certificates and instructed their members not to apply for these "slips of paper," an increase in the deck crew of many ships would then be inevitable. On the other hand, the unions might get together and agree on a certain increase of wage to be paid a certificated lifeboat man, and in this connection a certificated lifeboat men's union would not be an impossibility.

In defining an able-bodied seaman, the Act is very cleverly worded so as not to affect present members of the Seamen's union. The "three-year man" is an able-seaman by the grace of God and the Seamen's union. He may be lame, halt and blind, but the three-year proposition is like the law of the Medes and Persians—age can not wither him and infirmities count as naught. Physical examinations and tests of eyesight and hearing are not for such as he.

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San Francisco, California, March 31, 1915.

Mr. R. P. Schwerin,
Vice-President and General Manager,
Pacific Mail Steamship Company,
San Francisco, California.

Dear Sir:

Pursuant to your instructions we have verified the data compiled by the accounting department of the Pacific Mail Steamship Company to show a comparison between the present wages paid Asiatic crews on ships of the Company in the Trans-Pacific service, and the wages which would be paid if such ships were manned by European crews.

The following table shows the comparison between the present wages and feeding costs on the company's ships and prevailing wages paid European crews in Coastwise trade by other companies:

Basis of COASTWISE Wages

Ships Operated	WAGES			COST OF FEEDING			Total Increase Wages and Cost of Feeding
	Present	Proposed	Increase	Present	Proposed	Increase	
S. S. "Korea"	$ 60,233.04	$168,517.32	$108,284.28	$ 22,213.90	$ 56,764.80	$ 34,550.90	$142,835.18
S. S. "Siberia"	60,355.92	168,457.32	108,101.40	22,261.35	56,764.80	34,503.45	142,604.85
S. S. "Mongolia"	59,740.56	163,163.76	103,423.20	21,976.65	55,505.55	33,528.90	136,952.10
S. S. "Manchuria"	59,661.24	162,023.76	102,362.52	21,834.30	54,925.20	33,090.90	135,453.42
S. S. "China"	36,549.96	99,949.44	63,399.48	12,399.05	31,959.40	19,560.35	82,959.83
Total for ships owned	$276,540.72	$762,111.60	$485,570.88	$100,685.25	$255,919.75	$155,234.50	$640,805.38
S. S. "Persia"	$ 32,238.36	$ 85,444.80	$ 53,206.44	$ 9,997.35	$ 26,783.70	$ 16,786.35	$ 69,992.79
S. S. "Nile"	36,608.76	106,103.04	69,494.28	12,625.35	34,375.70	21,750.35	91,244.63
Total for ships not owned	$ 68,847.12	$191,547.84	$122,700.72	$ 22,622.70	$ 61,159.40	$ 38,536.70	$161,237.42
Total for ships operated	$345,387.84	$953,659.44	$608,271.60	$123,307.95	$317,079.15	$193,771.20	$802,042.80

We have examined the pay rolls and records of the Pacific Mail Steamship Company from which the foregoing statement was compiled, and have verified the procedure followed in detail. The present annual rate of wages has been taken from current pay rolls of the company. Proposed rates have been obtained by applying to the crews of ships in the Trans-Pacific trade, the rates which other companies operating on the Pacific Ocean are paying crews of their ships in the Coastwise trade.

The compilation in the foregoing table has been made on the basis mentioned, and we hereby certify to the correctness of the results set forth.

KLINK, BEAN & COMPANY,
By G. T. Klink,
Certified Public Accountant.

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Dear Sir:

Pursuant to your instructions we have verified the data compiled by the accounting department of the Pacific Mail Steamship Company to show a comparison between the present wages paid Asiatic crews on ships of the Company in the Trans-Pacific service, and the wages which would be paid if such ships were manned by European crews.

The following table shows the comparison between the present wages and feeding costs on the Company's ships and prevailing "off-shore" or deep-sea wages paid European crews by other companies:

Basis of DEEP-SEA Wages

Ships Operated	WAGES			COST OF FEEDING			Total Increase Wages and Cost of Feeding
	Present	Proposed	Increase	Present	Proposed	Increase	
S. S. "Korea"	$ 60,233.04	$136,297.32	$ 76,064.28	$ 22,213.90	$ 56,764.80	$ 34,550.90	$110,615.18
S. S. "Siberia"	60,355.92	136,177.32	75,821.40	22,261.35	56,764.80	34,503.45	110,324.85
S. S. "Mongolia"	59,740.56	131,963.76	72,223.20	21,976.65	55,505.55	33,528.90	105,752.10
S. S. "Manchuria"	59,661.24	131,063.76	71,402.52	21,834.30	54,925.20	33,090.90	104,493.42
S. S. "China"	36,549.96	81,229.44	44,679.48	12,399.05	31,959.40	19,560.35	64,239.83
Total for ships owned	$276,540.72	$616,731.60	$340,190.88	$100,685.25	$255,919.75	$155,234.50	$495,425.38
S. S. "Persia"	32,238.36	$ 69,724.80	$ 37,486.44	$ 9,997.35	$ 26,783.70	$ 16,786.35	$ 54,272.79
S. S. "Nile"	36,608.76	85,703.04	49,094.28	12,625.35	34,375.70	21,750.35	70,844.63
Total for ships not owned	$ 68,847.12	$155,427.84	$ 86,580.72	$ 22,622.70	$ 61,159.40	$ 38,536.70	$125,117.42
Total for ships operated	$345,387.84	$772,159.44	$426,771.60	$123,307.95	$317,079.15	$193,771.20	$620,542.80

We have examined the pay rolls and records of the Pacific Mail Steamship Company from which the foregoing statement was compiled, and have verified the procedure followed in detail. The present annual rate of wages has been taken from current pay rolls of the Company. Proposed rates have been obtained by applying to the crews of ships in the Trans-Pacific trade, the rates which the Company now pays English speaking crews on other off-shore runs.

The compilation in the foregoing table has been made on the basis mentioned, and we hereby certify to the correctness of the results set forth.

KLINK, BEAN & COMPANY,
By G. T. Klink,
Certified Public Accountant.

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A Foreign Trade Symposium

THE April issue of the Popular Science Monthly contains a series of articles under the general heading of "American Economic and Social Problems Arising Out of the War." Every American who feels an interest in our foreign trade relations and the awakening of this country to its new opportunities and responsibilities should secure the April number of this magazine and read this series of articles. The articles in question are devoid of rhetorical flights of fancy, there is no beating around the bush and the authors all know what it wrong and strike at these wrongs with honest, sledge-hammer blows.

In an address delivered before the annual meeting of the American Association for the Advancement of Science, the Hon. Charles H. Sherrill, late American Minister to the Argentina, hits boldly at the heart of his subject without any preliminary palaver:

"Listen to a message from the country:" he says, "'Give new freedom to our railroads and our dying merchant marine so that they can aid our crusade for foreign trade, and permit American labor employers to combine abroad so as successfully to compete there against foreign combinations paying much lower wages.' So audible is this message in all parts of our land that if there be legislators who have not already heard at least some of its wave sounds, then there must be something wrong with their political wireless telegraph outfit, or, to drop into archaic phrase 'they haven't got their ears to the ground.' This message comes from an aroused country which has recently become aware of certain entanglements that it wants removed. Rip Van Winkle has awakened from his long repose in the Catskills of home trade, but the first few attempts to stretch himself have revealed that clinging creepers have grown about his limbs. These creepers will have to go, and if the sharpness of existing legislative wits are not sharp enough to cut them, others will be found to do it."

The speaker goes on to show how sadly the American producer has been mistaken in his attitude of indifference towards a foreign trade merchant marine on the ground that foreign ships were cheap ships and foreign freight rates were low. As soon as the foreign lines had corralled the cream of the trans-Atlantic business they took good care of freight rates. He points out how this country has been outwitted times without number in the making of foreign treaties and cites as an example the Hay-Pauncefote treaty in which everything works to the benefit of England and in which there is NO CLAUSE PROVIDING FOR THE ABROGATION OF THE TREATY. In conclusion, Mr. Sherrill states "The message comes from no youthful debating societies, nor is it prefaced by the word 'please'—it comes from thousands of men, full grown in their heads as in their bodies, business men who have organized to protect their rights and to get what they deserve, and who have come to know of certain impediments thereto which they properly expect to have removed by the Government which they themselves elected."

Another article of exceptional interest is entitled "The Extension of our Merchant Marine," and is written by George W. Norris, Director of Wharves, Docks and Ferries, Philadelphia. Here we find a writer with a direct hammer and tongs attack on his subject; no unpalatable truths are glossed over and the real political and economic dangers of our situation are dealt with directly and forcibly. Mr. Norris says in part:

"Leave out the question of national defense, and look merely at what our position would be if, instead of an undisputed mastery of the sea by England, there was an even distribution of sea power and England, France, Germany and Austria were all preying upon each other's commerce, and goods could not be shipped with safety in the vessels of any of those nations. We produce about 42 per cent. of the world's pig iron, nearly 25 per cent. of its wheat, over 40 per cent of its coal, over 70 per cent. of its corn and 60 per cent. of its cotton. A great deal of our production of these articles we export—two-thirds of our cotton and nearly a quarter of our wheat, not to speak of 32 million barrels of petroleum annually—and with these exports we pay a large part of our annual charge of 600 to 800 millions due to the rest of the world for interest, dividends, freights and payments and remittances of various kinds. If there were no ships in which these goods could be exported, what pen could describe the financial and industrial chaos in which we should be plunged? Think of the point to which wheat would drop? Think of the iron furnaces out of blast, the mines closed down, the farmers ruined, and our gold supply exhausted, unless universal repudiation were enforced. The picture is too horrible to contemplate, and yet, like a drunken man dancing on a tight rope, we go relying upon the providential mercy which has thus far preserved us from such a national catastrophe. This is no figure of rhetoric, or overdrawn picture. It is a self-evident peril, which stares us in the face and to which only fatuous folly will seek to close its eyes. But have we no ships, you may ask? Oh, yes, if you will refer to the last issue of Lloyd's Register you will be gratified to find that the American Merchant Marine comprises 3,100 vessels of over 5,300,000 tons gross register, and these figures are the narcotic which has lulled to sleep so many of our statesmen and business men and economists. . . . The available ocean-

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going marine is therefore just about equal in tonnage to the fleet of one single German company. Put in a different form, whereas, in 1861 over 65 per cent. of our foreign commerce was carried in American bottoms, in 1901 only 8 per cent. was so carried. To-day our foreign commerce represents about one-eighth of the world's total, and not more than one-tenth of that one-eighth, or 1¼ per cent. of the world's commerce is carried in American bottoms. For the carriage of the other nine-tenths of our foreign commerce it is estimated that we are paying to the shipowners of other nations in ocean freights from $200,000,000 to $250,000,000 a year. This is a direct loss, and takes no account of the profits we might make if, like other nations, we engaged in the business of transporting goods other than our own. . . . Having thus bound a ligature around each leg of our merchant marine, we have watched the legs atrophy, and have for forty years confined ourselves to eloquent regrets that our bound and shackled victim did not run and dance, and to expressions of fervid hope that he soon would. We can grant a monopoly of coastwise commerce. We can give a practical monopoly to a public utility company, or a limited monopoly to a line of land transportation, but, on the broad ocean, which is the highway of all the world, there can be neither monopoly or preference, by nation, race or creed. There all comers meet on equal terms, and 'the race is to the swift, the battle to the strong.' In that unrestricted competition the weak, the overburdened and the handicapped can not even hope for success. Is it not about time for a people as intelligent as the American people to alter their attitude upon this all-important subject?"

This is strong language, but none too strong. The trade press of England, generally speaking, looks somewhat askance at America's growing aspirations to return once more to the sea. Their general argument follows the trend that English shipping is not making undue profits and that many companies have shown poor balance sheets for the past few years. They ask, why should Americans embark in such a poor business? As a matter of fact, the general average of British steamships show a fair return on the investment, but the question of returns to shipowners is not at issue. The question is not "How about the welfare of the shipowner?" but "how about the welfare of the nation?" Great Britain's dividends from her far-flung merchant fleets have amounted to sums that beggar all description. It is their gross earnings and not dividends paid to stockholders that have made the English nation a reservoir of capital which has been drawn upon from every quarter of the earth.

Another writer in this number of The Popular Science Monthly whose article on "The War and Foreign Trade" fairly bristles with sharply drawn truths, is Mr. H. E. Miles, of Racine, Wisconsin, vice-president of the Association of Manufacturers. Here are some short extracts: "As a people we are ignorant of foreign trade. America has been likened to a huge stevedore bearing down to the ships of the sea crude and semi-crude material for the use of the capital, labor and intelligence of foreign nations. Such exportation is a depletion of our natural resources, the heritage of the ages and irreplaceable. Until a few years ago we were always speaking of our 'limitless natural resources.' We now see that under present processes those resources will be exhausted within a period that to the far-sighted is as a day. As President Wallace said at the recent Conservation Congress: 'The nineteenth century farmer was no farmer at all; he was a miner, mining the fertility of the soil, and selling it for the bare cost of the mining.' We sell our cotton to Switzerland at 14 cents per pound, with scarce any labor in it. We buy it back in the form of fine handkerchiefs at $40 a pound, all labor. We export bar iron and import razor blades, export hides and import gloves, export copper and import art bronzes. We must acquire the skill of the foreigner to the end that our exports shall carry the maximum and not the minimum of high class labor.

"Providence has been kind to us, but Providence is likely now to leave us a little more to our own intelligence. We must henceforth sell more brains and less material. We must, to the utmost degree, develop our human efficiencies. In them is our supreme natural resource, and the only one that increases with use and will increase forever and immeasurably. Other nations, lacking our raw materials, make the cultivation of their human resources the substantial basis of their prosperity and happiness. . . . Many other things may be said, and have been, as to the development of foreign trade. We must have banks in foreign countries and a merchant marine. We must stop generalizing and be specific. We must get over our provincialism and be catholic in our sympathies. We must realize that the ocean which used to separate the countries, now binds them together. The $1.25 which carries a ton of freight one hundred miles on land, carries it a thousand miles on water. Merchandise delivered at the nearest salt water port is almost as good as delivered at any other port in the world."

There are eleven articles dealing with the problems that have grown out of or been accentuated by the war, and they form a well-balanced and highly instructive study of our present business outlook.

Lewis Nixon, former shipbuilder, has resigned as Commissioner of Public Works and Consulting Engineer of the Borough of Richmond, New York, and it is rumored that he will again become engaged in some shipbuilding venture.

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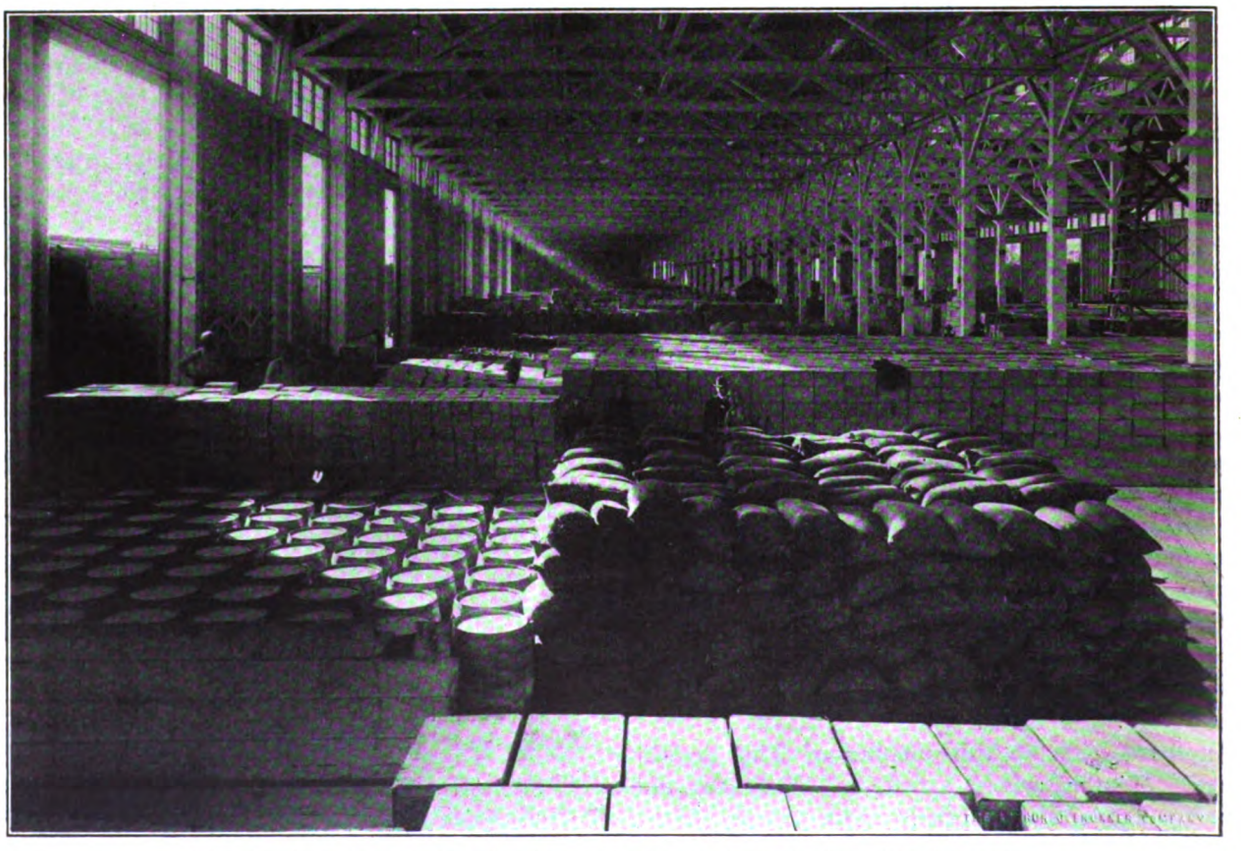


The S. S. "Lewis Luckenbach" at Pier 36, San Francisco, discharging her first Panama cargo

The Luckenbach Steamship Company

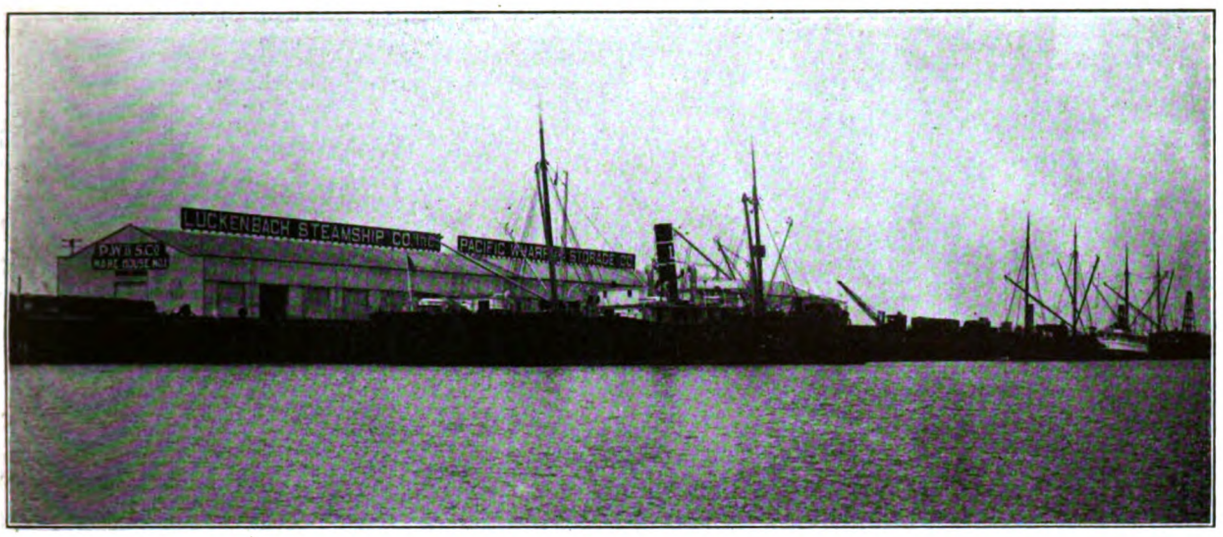
WHEN the announcement was made in January, 1913, that the Luckenbach Steamship Company would begin operations from this port, followed by the departure of their S.S. "Lewis Luckenbach" February 4, 1913, the shipping community witnessed the initial step in what has since developed into one of the foremost transportation activities of this port.

The "Lewis Luckenbach" and "Pleiades" were operated on the express run to Panama and the popularity of this service became so manifest that the schedule was shortly augmented by the "Lyra"



The interior of the San Francisco terminal of the Luckenbach Steamship Company

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The Luckenbach wharf at San Pedro

and "Damara." These four large American steamers were operated by the Luckenbach Company on a fortnightly schedule in connection with the Panama Railroad S.S. line from New York.

The opening of the Panama Canal in August, 1914, found this company in a happy condition of preparedness with four steamers on the Pacific side and the same number on the Atlantic side. They had the honor of dispatching the first merchant steamer loaded with San Francisco products through the Panama Canal, and immediately following this event, established a ten days' service between San Francisco and New York. Within the last month, three steamers have been added to the service and a weekly schedule is now maintained.

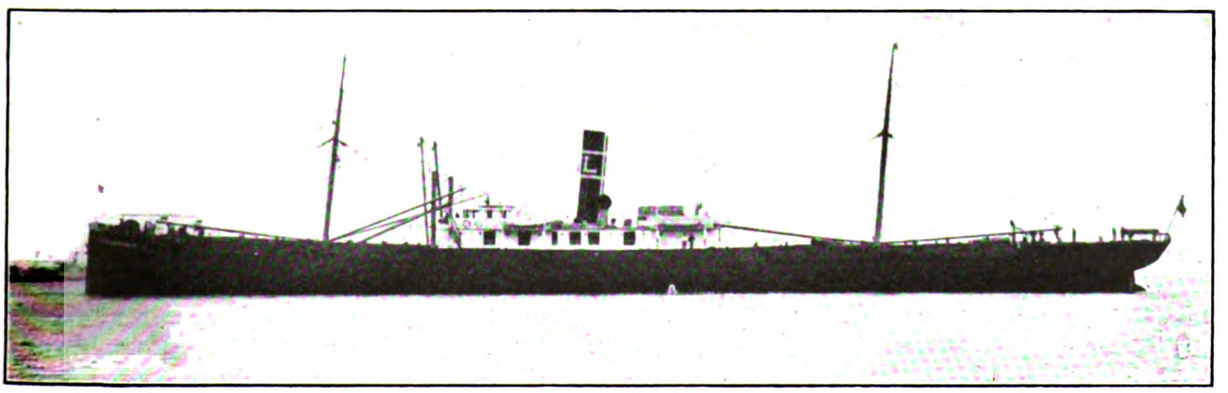
The accompanying illustrations afford an interesting comparison of the Luckenbach Company's growth. The S.S. "Lewis Luckenbach" is shown at Pier No. 36 discharging the first Panama cargo in March, 1913. Pier 46 has since been completed for this company, and an interior view herewith gives ample evidence of the commodious facilities, which the company now enjoys at San Francisco.

This magnificent pier, which is the most recent one completed by the present Board of Harbor Commissioners, is 200 feet by 800 feet, has two surface level tracks, a driveway 35 feet wide and is equipped with all modern facilities for the expeditious handling of package cargo by car or by team.

While the name "Luckenbach" is comparatively young in the annals of the Pacific Coast, it has been actively known on the Atlantic Coast since 1866. The business was established in Philadelphia that year by Lewis Luckenbach, transferred to New York in 1870 and remained under his management until his death in 1906. Mr. Luckenbach was the founder and the pioneer in barge transportation. Like many innovations, this proposal was viewed with skepticism by both underwriters and merchants, but after convincing trials, it was finally accepted as a sound and practical method of transportation both coastwise and transocean.

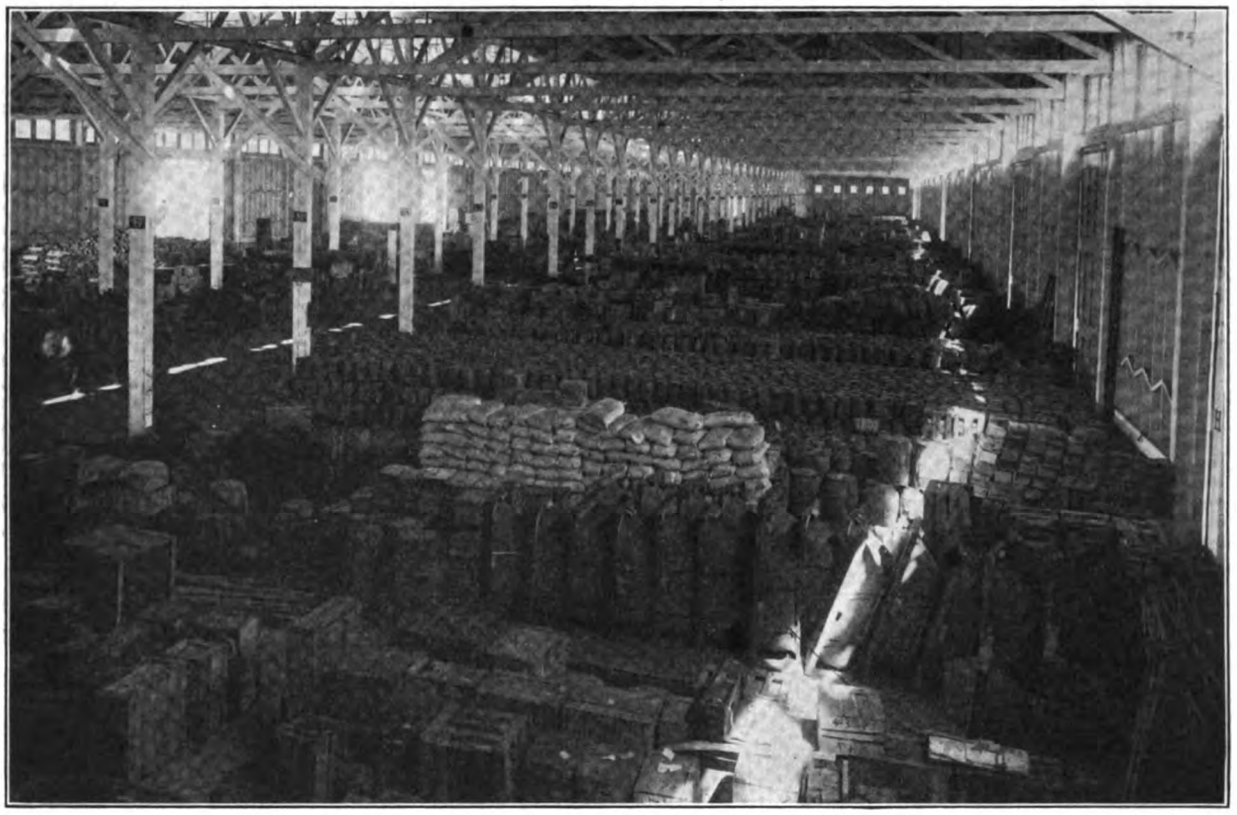
Mr. Edgar F. Luckenbach assumed the management after his father's death and has bent his energies to the acquisition and maintenance of the large fleet of steamers which flies the company's flag, reproduced on the inside cover page.

The management of their Pacific Coast interests is in the hands of R. C. Thackara, vice-president of the company.



The steamer "Lewis Luckenbach"

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A mass of freight on the Luckenbach wharf

WINE SHIP ATTRACTS ATTENTION.

The article in the April Pacific Marine Review on the proposed wine ships for the California Wine Association has aroused a great deal of interest in financial as well as shipping circles. As an outlet for the further development of one of California's greatest and most famous industries, the project of transporting wine in bulk posesses almost unlimited possibilities.

The wine production of California has assumed very large proportions and at the same time has succeeded in annexing an enviable reputation as to quality. Our countrymen are prone to consider themselves ahead of the whole world in everything and at the same time insist on using imported goods. This condition is brought about partly through large foreign elements in our population and partly through the innate desire on the part of our people to be fooled. The shibboleth of foreign superiority has clung more tenaciously to wines, perhaps, than to any other article and yet we find that at the last great European exposition, that held at Turin, Italy, the California wines practically swept the boards as far as honors were concerned. In short, the wine producers of our country find themselves with the very promising possibility of an European market before their eyes. The reputation of our wines is established, Europe will face a serious shortage for several years at least after the present war has ceased, and with these two conditions in our favor the only problem to solve is that of cheap and efficient transportation.

The natural manner of transporting wine at sea would be in a tank ship of the same character as an oil tanker, but here we are confronted with the question of costs. In order to reach European markets the wine must be landed at a price which leaves too small a margin to pay for bringing the wine ship back to California in ballast. Even the somewhat shorter voyage from San Francisco to New York, in order to reach the wine distributing center of the Eastern States, would be too expensive if the ship had to make her return voyage in ballast.

The necessity of strictly limiting the carrying costs of transporting the wine, makes the use of a type of ship which is capable of carrying additional freight each way imperative. In considering the run from San Francisco to New York the happy combination of lumber east bound and heavy steel products west bound at once presents itself. This condition is certainly an ideal one for a ship carrying bulk wine as a part cargo on her Eastern voyage. The wine cargo in wing tanks with lumber in central hold and as a deck load is ideal from almost every point of view. The central holds, being wall sided, lend themselves readily to quick and cheap loading and unloading and the Government's decision doing away with practically all of the deck load tolls at the Panama Canal makes lumber an attractive freight. On the return voyage a heavy steel cargo enables the proposed ship to carry her dead weight capacity without utilizing her wine tanks.

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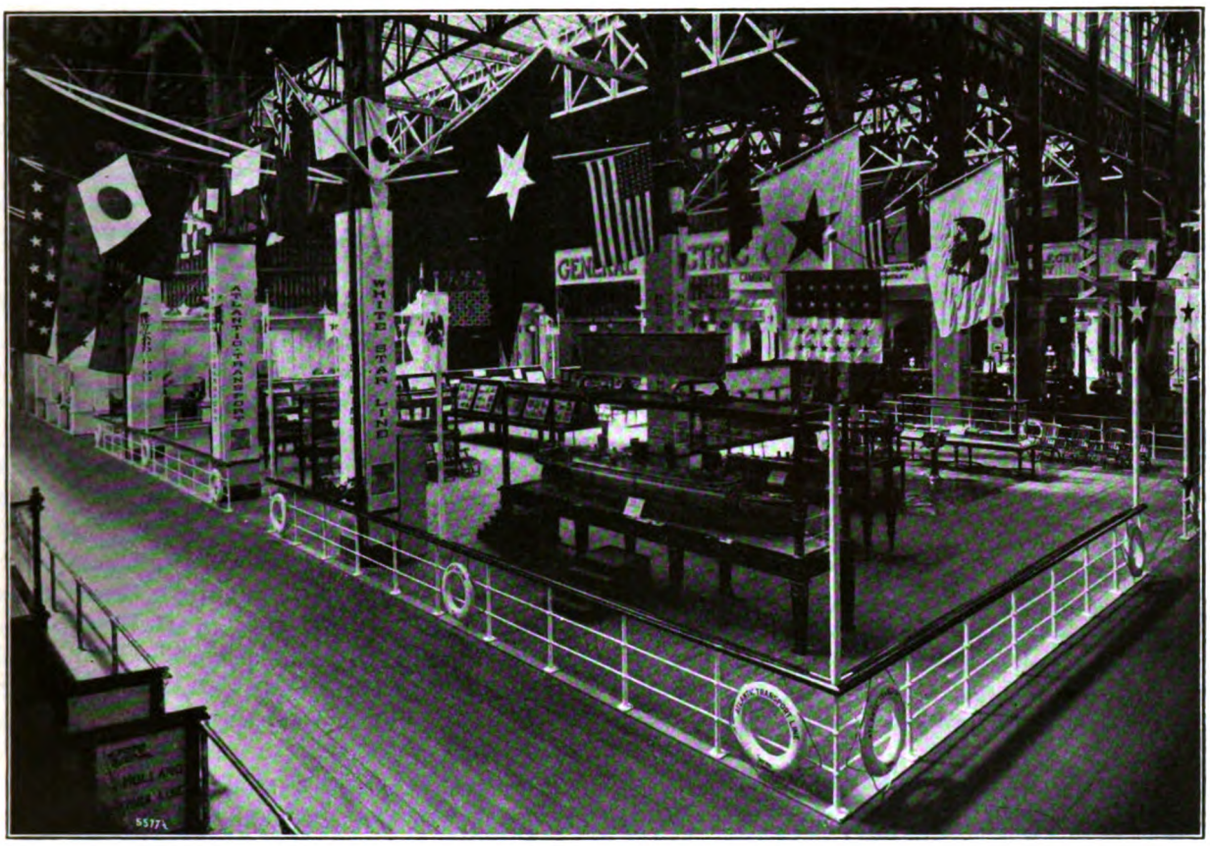


Exhibit of International Mercantile Marine Company

The amazing advance in ocean transportation during the past half century is strikingly exemplified by the beautiful models of transatlantic steamers in the Exhibit of the International Mercantile Marine Co., officially opened on Monday, April 12th. The services of this Company comprise the well known American, Atlantic Transport, Dominion, Leyland, Red Star, White Star and White Star-Dominion Lines, operating between New York, Boston, Philadelphia, Portland, Me., Montreal, Quebec, and Northern and Southern European ports. The company also operates the newly formed Panama Pacific Line between San Francisco and New York through the Panama Canal, calling at Los Angeles and San Diego, and a fine model of the S. S. "Finland" and "Kroonland" of this service is in the Exhibit.

The wonderful development of the steamers is splendidly shown by the models of the first "Britannic," 5000 tons placed alongside the model of the almost completed 50,000-ton leviathan "Britannic," the largest of all British steamers, soon to be added to the White Star fleet. These models will show at a glance the wonderful progress, not only in the size but also in creature comforts aboard the great fleets of the Atlantic.

The Exhibit is enclosed in a ship's rail and the hours and half-hours will be struck on a ship's bell, while house-flags, signal-flags, a large engine-room telegraph, steamer-chairs, and other things nautical add a tang reminiscent of foreign travel to this comprehensive exhibit at the beautiful Exposition on the shores of the Pacific.

The company's exhibit will be of special interest to the public at this time in view of the inauguration next month of their new high-class fast-passenger and express freight service between San Francisco and New York through the Panama Canal.

The figures giving an epitome of the tonnage passing through the Suez Canal in 1914 is illustrative of the rapid growth of our foreign trade merchant marine. In tonnage passing through this great highway we are now ahead of Persia, having assumed a place midway between Persia and Siam. The 26,866,940 gross tons of vessels passing through the Suez in 1914 was made up as follows: British, 66.09 per cent.; German, 11.02 per cent.; Dutch, 7.17 per cent.; French, 4.53 per cent.; Austrian, 3.24 per cent.; Italian, 1.94 per cent.; Japanese, 1.81 per cent.; Russian, 1.01 per cent.; Danish, 0.81 per cent.; Greek, 0.67 per cent.; Swedish, 0.65 per cent.; Norwegian, 0.48 per cent.; Spanish, 0.39 per cent.; Turkey, 0.13 per cent.; Siamese, 0.03 per cent.; American, 0.02 per cent., and Persian, 0.01 per cent.

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PACIFIC MARINE REVIEW

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The court martial proceedings against a junior lieutenant, a chief watertender and a chief machinist seeking to prove them responsible for the explosion of six water tube boilers on the cruiser "San Diego," formerly the "California," presents some points of interest. It brings out clearly the injustice of our naval system as far as the engine-room force is concerned. The man responsible for the engine-room on one of our naval vessels does not necessarily know anything about his business. The Navy has no engineers, at least no actual engineering officers. Warrant machinists operate the machinery and warrant machinist is as high a rank an an engineer can attain to. We have had engineer admirals in the United States Navy and among these are numbered some names that are famous in Navy annals.

In the case of the "San Diego" the court martial board was made up of a retired captain, a major of the marine corps, two lieutenant commanders, a paymaster, a past assistant surgeon, while a retired marine corps captain acted as judge advocate. Of these seven men, four at least are not fitted to decide any marine engineering question. There is nothing more vital to the modern war vessel than her mass of intricate machinery and the men who have direct charge of it should have the privilege of going as far and as high as any deck officer. There are many brilliant engineers in the United States Navy and the entire world owes them a debt of gratitude for a great mass of valuable research work, but aside from naval constructors who take care of the planning and construction of our vessels, the line officer on sea duty has no incentive to interest himself in the engineering feature of a vessel unless his natural tendencies lead him to make a hobby of the subject. If Secretary Daniels would apply himself to opening the way for the promotion of warrant machinists with the same energy that he has advocated a lot of petty and unimportant details his efforts might be productive of some good results.

POLITICAL NEUTRALITY.

If one follows the various moves of our Government in its efforts to preserve a strict neutrality and at the same time please everybody at home, he will witness all the antics of a clown in a three-ring circus. German or Austrian Americans have cause to feel grieved at the action of our Government one day and pleased the next, and the same is true of the sympathizers of the Allies. The "Dacia," a former German vessel, is loaded for Europe at Galveston; her actual ownership is a matter of doubt and Great Britain notifies Washington of her intent to seize that vessel. Immediately the press sets up a wild howl, suggesting every sort of reprisal, and the German element in this country naturally felt elated. Seeing which way the wind blew, England notified France to capture the "Dacia," which that nation very promptly did. The protest over the capture hardly amounted to a whisper, and that should please our French, English and Russian population. The "Eitel" sinks the American ship "Frye," apparently without reason or cause, puts into Hampton Roads for repairs and coal, and her officers are received with all the honors of the republic and are feted, wined and dined. Furthermore, clearance from Hampton Roads is refused merchant vessels of the Allies for fear that word of the "Eitel's" movements will be conveyed to the cruisers lying in wait for her. This should prove highly edifying to German-Americans and very distasteful to our citizens who look upon the Allied powers as their fatherlands. It would appear that the next move should be made to please the Allies. There are people who believe that this double-edged neutrality is undignified and harmful, but they must remember that there are very large factions of voters whose sympathies lie on one side or other of the great European struggle, and a government whose foundations even have been plastered thickly with politics must ever keep its fingers on the pulse of the coming elections. Our neutrality policy has been one of backing and filling, it is not getting us into any serious trouble, but it is winning us a great deal of contempt. Any of the nations now at war can sink an American ship if they so desire. They will be asked to pay for the craft and there the matter will drop. The measuring stick of our national pride is now more minutely divided than ever and the unit of division is the almighty dollar.

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A NEW SOCIETY AND ITS OBJECT.

According to Commerce Reports New Orleans is the latest American city to make a determined effort to promote the interests of the American foreign trade merchant marine. The following extract is of interest:

"Recognizing the need for some organized action looking toward the establishment of regular steamship services out of Gulf ports, under the American flag and American ownership, a group of practical steamship men in New Orleans and vicinity have organized 'The Society for the Development of American Shipping (Inc.)' (chartered at New Orleans March 12, 1915). Their object is first to spread throughout the Gulf States and the Mississippi Valley accurate information regarding the present shipping situation, under which the export trade of this region is practically wholly dependent on foreign-owned vessels. For the formation of 'a healthy public sentiment' in favor of the formation of American steamship services, this society proposes to make use of the public press and of publications issued by itself. It also proposes 'to encourage the enactment and enforcement of legislation favorable to the enlargement, development and sustained prosperity of the American merchant marine and of American shipowners and seamen.'

"Should the society's efforts succeed in bringing about such public interest in the South and West as would indicate adequate support of a line of steamers the society is empowered to participate and assist in the promotion, organization, and operation of corporations for building, acquiring, owning, or operating ships under the American flag. It is therefore in a position to promote the organization of American steamship services, and this is the ultimate object of its founders. In fact, plans are now being perfected for the formation of such a company.

"The society is capitalized at $10,000, divided into 1,000 shares, and 8,010 shares have already been subscribed by the founders. The president of the society is Mr. A. H. Clement, of A. H. Clement & Co., forwarding agents, of New Orleans; the vice-president is Mr. J. W. Corry, of Gulfport, Miss., an experienced American steamship operator. The secretary and treasurer is Mr. George S. Taylor, formerly vice-president of Mobile Steamship Co., of Mobile, Ala.

"The charter of the society provides that all members of the board of directors shall be citizens of the United States, and also that any citizen of the United States may be made an honorary member, with the privilege of attending meetings and acting in an advisory capacity.

"Mr. Corry, one of the leaders of this enterprise, stated that he believes from his own experience that steamships can be successfully and profitably operated under the American flag, and that any steamship line which the society may undertake to promote must be designed to be a profitable investment, but operated to develop the export trade of the United States."

LAKE VESSELS ON THE ATLANTIC.

Considerable attention has been paid in the American press to the tendency to draw upon the Great Lakes for shipping to relieve the scarcity of tonnage in the Atlantic trades. It is worthy of note that nearly all the Great Lakes tonnage which it is contemplated moving to the Atlantic consists of Canadian vessels. The Canada Steamship Lines Ltd. have a dozen of their vessels under charter and five steamers of the Montreal Transportation Company are being transferred to Atlantic service. The transferred vessels will operate principally in the coal trade between United States ports and South America and the West Indies. In this connection it must be remembered that a goodly number of the Canadian great lakes vessels were built in Great Britain, and while their size has been limited by the capacity of the Welland canal locks, they are suitable for salt water service owing to their surface condensers and copper piping. On the other hand, many American vessels on the Lakes would not be available for Atlantic service without considerable expenditures in their engine rooms.

SEATTLE AND THE SEAMEN'S ACT.

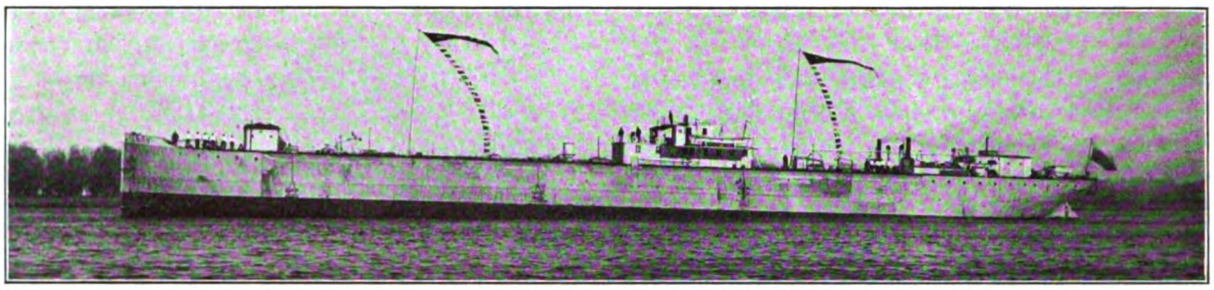
The New Seattle Chamber of Commerce Record in a recent issue on the subject of the Seamen's bill ends up with the following conjecture:

"What effect it will have on our Japanese lines remains to be seen. Under the provisions of this law a crew might be persuaded to desert and no crew of Japanese could be secured in Seattle at a day's notice. Vancouver, British Columbia, on the other hand, does not subject the ship operator to any such menace."

The last sentence of this extract is highly significant not only to Seattle but also to Tacoma and other Puget Sound ports.

The statistics of exports from British Columbia seaports now show a goodly percentage of goods originating in the United States. Will any steamship line engaged on the over-sea routes from Victoria or Vancouver or Prince Rupert continue to visit Puget Sound ports in the face of such a burden as the Seamen's Act will inflict? Is it not just possible that tugs and barges transporting American freight to Victoria or Vancouver for transshipping to its ultimate destination will supersede the visits of the steamers themselves? This half-baked bit of legislation, the Seamen's Act, is certainly going to have its troubles at home as well as abroad.

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Shipping Notes

Three 600-foot towers for a wireless station are to be erected at Cavite, Philippine Islands, in the near future. It is believed that towers of this height if properly equipped will be able to receive messages clear across the Pacific Ocean.

An innovation of interest in the new lighthouse tender "Cedar," bids for which were opened on April 27, is the fact that she will be armed with four six-pounder machine guns. The "Cedar" is to be an oil-burner with a length over all of 200′ 8″, length on water line 188′ 0″, molded beam 36′ 0″ and a molded depth of 19′ 3″. The new craft will be the most pretentious of all the United States lighthouse tenders, and will be used in the Alaskan district.

The Royal Mail Steam Packet steamer "Glengyle" is now carrying passengers on the Victoria-Oriental run. Her owners were induced to take this step on account of the scarcity of passenger liners on the Canadian-Oriental routes due to the withdrawal of several large steamers for war purposes. The "Glengyle" has accommodations for a very limited number of first class passengers, only twenty in all, and naturally with such a small number on such a large vessel the cabin accommodations are very roomy and comfortable.

Messrs. Alfred Holt and Company, home managers of the Blue Funnel Line, have also been given operating charge of the "Knight" steamers until the close of the European war. Three of these steamers, "Knight of the Thistle," "Knight of the Garter" and "Knight Templar," are well known in North Pacific Coast ports.

The Standard Oil tanker "Maverick" has been undergoing repairs at the Craig Shipbuilding Yard, Long Beach.

Referring to an order in council passed by the Dominion Government on March 11 permitting foreign bottoms to sell their fish in British Columbian ports, Consul General R. E. Mansfield, stationed at Vancouver, has the following to say in "Commerce Reports":

This order will encourage the development of the industry in British Columbia, but will have an adverse effect upon the business on the Puget Sound by diverting traffic from Seattle to Prince Rupert.

Under present regulations foreign fishing concerns are permitted to land fresh fish at a Canadian port and transship the same in bond to an American port, but without the right to sell in Canada. This has prevented smaller ships the catches of which will not make up a carload or the owners of which were not in position themselves to ship their fish to eastern United States availing themselves of the privileges.

Prince Rupert, which will be the principal port of entry for fish under the new arrangement, is several hundred miles nearer the fishing grounds than Vancouver or Seattle, and the opening of the Grand Trunk Pacific Railway, recently completed to the coast, will furnish a direct line of communication from the Pacific port to eastern markets.

Last year 70,000,000 pounds of fish (halibut) were caught in the Pacific, most of it on the northern banks. Of this approximately 10,000,000 pounds were shipped through Vancouver, an equal amount through Prince Rupert, and the remainder through Seattle. Under the new order in council practically all the halibut will be shipped through Prince Rupert, which will become a great fishing center, because the fleet will make its headquarters, purchasing supplies, and spending money there.

The death of Jacob R. Andrews in New York on March 25, removes one of the best loved men in marine engineering and shipbuilding circles. Mr. Andrews spent much of his time of late years in New York, and was generally to be found at the Engineers' Club, where his presence proved a boon to visiting engineers from all over the United States. Mr. Andrews was fifty-four years of age at the time of his death and had been looking forward eagerly to a greater measure of freedom from business cares. He began work as an apprentice with the late Gen. Thomas W. Hyde, and upon the latter's death succeeded in the management of the Hyde Windlass Company. The property went into the hands of the United States Shipbuilding Company and upon the dissolving of this concern, Mr. Andrews secured the control of the valuable Bath plant.

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Pacific Coast Shipping Notes

SAN FRANCISCO.

Mr. H. B. Brittain has been appointed district Passenger Agent of the Pacific Coast Steamship Company, to succeed W. R. Meech, resigned.

The Union Oil Company's tanker "Santa Rita," which was sold recently to enter the trans-Atlantic trade, will be replaced, it is said, by a new 65,000 barrel tanker, a contract for which will shortly be let.

Captain Frederick Rouse, a well-known Pacific skipper and the originator of the Rouse sea anchor, is at present making a tour of the eastern seaboard interesting owners in his patent device and at the same time renewing old acquaintances.

The old frigate "Omaha," which has been doing duty for many years as a quarantine station off California City, was burned at Bay View about two weeks ago. The old craft was purchased by Messrs. Smith and Budrow, who burned her hull in order to get the copper fastenings.

The Pacific Coast has always been noted for its resourcefulness in the face of difficulties, especially along every engineering line of endeavor. Far removed from the source of raw materials, our engineers have undertaken many things that would have been considered impossible elsewhere. The latest and most wonderful of these departures from all ordinary practice happened less than two months ago, according to the San Francisco Examiner. On March 28 appeared a story in this daily, setting forth how Chief Mate E. M. McAllister of the steam-schooner "O. M. Clark," accompanied by five seamen, rowed a boat seven hundred miles to secure aid for their vessel. Now this was a splendid and courageous thing on the part of these six men, but even the human grit of the thing is lost sight of entirely before an engineering marvel that accompanied it. Listen to this:

"The schooner, which was bound from Hilo, Hawaii, to San Diego, broke a tail-shaft on March 13 when three days out. Progres by sailing not proving successful, a small boat was started last Sunday for the California coast to repair the tail-shaft and return. Chief Mate E. M. McAllister and his five sailors had to row most of their six days' voyage, as a southeaster made raising their small sail dangerous. The 'Clark' was riding nicely, McAllister said, when he left it four hundred miles off Point Conception. He expects to get the tail-shaft repaired and then will return, probably in a gasoline launch."

Now it must be admitted that transporting a tail-shaft 700 miles in a small boat during a southeaster is a performance that is not to be sniffed at, and yet the magnificent feat was performed in vain, as the "Clark" arrived at San Pedro on April 1 under her own sail.

SEATTLE.

W. R. Robinson is now installed as Seattle manager for the W. R. Grace and Company's steamers. Robinson was formerly in the company's New York offices and was moved to Seattle after a three months' stay in San Francisco, where he was familiarizing himself with Pacific Coast shipping conditions.

The Border Line Transportation Company, of which Dodwell and Company, Ltd., Seattle, are the general agents, is one of the newest steamship ventures in the Northwest, being less than two years old. Starting operations with the "Fulton," a steamer of 800 tons dead weight capacity, the company soon annexed the "Despatch," of 1200 tons and accommodations for 96 passengers, and the "Wakena," a small freighter of 450 tons dead weight capacity. At the close of 1914, the company purchased the steamers "Al-Ki" and "Northland" from the Northland Steamship Company. The "Al-Ki" is a handy coaster with accommodations for 136 passengers and 1500 tons of freight, while the "Northland" is a freighter of 900 tons capacity.

The "Despatch" is operating via Ketchikan to West Coast Prince of Wales Island and Sitka, while the "Al-Ki" is operating to Ketchikan, Wrangell, Petersburg and Juneau, returning via the same ports. The "Northland" is used as a

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free lance, carrying explosives and cannery supplies on both routes.

The "Fulton" and "Wakena" ply between Puget Sound and British Columbia ports as far north as Powell River. The Border Line has a contract with the Powell River Paper Company for movement of their entire output to the United States. This aggregates from four to five thousand tons per month of newsprint paper.

Mr. S. Murata, manager of the Osaka Shosen Kaisha, was a recent visitor to Seattle and Tacoma.

During the recent annual overhauls of the steamers "Governor," "President" and "Congress" of the Pacific Coast Steamship Company, considerable alteration and additions to passenger accommodations were carried out. Additional staterooms were installed on the "President" and "Governor" and second-class four-berth rooms on the "Congress" were altered into two-berth first-class rooms. The first-class passenger accommodations of the three boats were increased by a total of 180 passengers. Another interesting change is the use of oil fuel in the kitchens of these three vessels. Coal is only carried now for the use of the broilers.

The rumor that the old "Admiralen" was to be sold by the Pacific Sea Products Company and was to be used in the trans-Atlantic trade is illustrative of the scramble to secure ships of any kind. The "Admiralen" is an iron steamer 254 feet long, 32 feet beam and 17.8 feet deep. She is forty-six years old.

The Seattle yard of the American Dredge Building and Construction Company have a $100,000 dredger under way for the American Tin Dredging Company, a Portland corporation, in which L. W. Kendall, manager of the American Can Company, and Francis Cutting, a San Francisco capitalist, are the dominating figures. The new dredger, which will be used on Buck Creek, Alaska, will be a bucket dredge of the screen type fitted with double flumes and a manganese screen. It is expected that the Alaska tins in conjunction with the tin ores imported from Bolivia will be sufficient to keep the new Jamme smelters at Seattle busy. With the gradual depletion of the tin deposits of the Strait Settlements and Tasmania, tin has advanced in value from 34 to 56 cents per pound and as there is a twenty-two-year supply at the present rate of consumption in the developed tin areas of Alaska, more dredgers will probably be built in the near future.

PORTLAND.

Mr. E. W. Wright, former manager of the Portland Merchants Exchange, has been appointed manager of the Port of Portland to succeed the late Marcus Talbot. Mr. Wright is an old steamboat man having served on the Mississippi prior to his removal to Oregon in 1882.

The cannery ship "Berlin," owned by the Alaska Portland Packers' Association, sailed from Astoria for Nushagak, April 14th. The "Levi G. Burgess," same ownership, will leave Astoria on the 17th and the tug "Akutan" a few days later.

The steamer "St. Helens" was on the Oregon drydock at the plant of the Willamette Iron & Steel Co., last Friday, undergoing slight repairs to her bottom. During the trip from San Francisco to Portland a leak developed in No. 1 tank which required about fifteen new rivets and the calking of others, in order to have the vessel in good condition for the trip from Columbia River to New York.

Captain E. C. Genereaux has recently located in Portland. Captain Genereaux plans to go into the stevedore business here, being associated with some other parties. He will also do independent surveying on the Columbia River. Just prior to coming to Portland, Captain Genereaux was connected with the dredging which is being done at Astoria in connection with the water front improvements of that city.

The Port of Portland Commission have definitely decided not to turn over the towing service at the mouth of the Columbia River to the Puget Sound Tug Boat Company. Negotiations have been under way for some time relative to this matter and a decision was reached March 26. The Commission intend to take immediate steps to improve the service, and it is possible that a new tug will be built to work in connection with the "Oneonta" and "Wallula." Although the Port loses money annually by reason of its maintaining the service, it was deemed more satisfactory for all concerned to continue the towage work rather than to hand it over to an outside company. Shippers in Portland and people interested in marine matters here are very glad that this action was taken by the Commission.

The St. Johns Shipbuilding Company recently received a contract for the construction of two Government barges for service on the Coquille River. The barges will be 90 feet long, 32 feet beam and 7′ 6″ depth of hold and will be used for transporting rock. Their rated capacity will be 400 tons.

New boilers are being installed in the new Port of Portland dredger "Columbia" by the Ballin Watertube Boiler Company at a cost of $26,850. This company has also just completed an installation of new boilers in the Government dredger "Colonel P. S. Michie." Each of these steam generators will have 9000 square feet of heating surface and the boilers of the new "Columbia" are expected to furnish sufficient steam for about 3000 horse-power.

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Opening of the Celilo Canal

MAY 3rd to May 8th have been set as the dates between which the formal opening of the Celilo Canal will connect up two navigable sections of the Columbia and Snake Rivers and make through navigation possible from Lewiston, Idaho, to the Pacific Ocean. The importance of this event can hardly be over-estimated. A great section of country that has only been scratched as far as either mineral or agricultural possibilities are concerned will be opened up by direct water communication with Portland, and that city's preeminence as a grain shipping port will be greatly enhanced.

The Celilo Canal was built at an expense of approximately $4,850,000, and the work of construction was commenced in 1905. The new waterway is located on the Oregon side of the Columbia and roughly parallels the course of the stream for a distance of eight and one-half miles.

Engineering Features Described.

Major Jay J. Morrow, United States Engineering Corps, who has been the supervising Major of engineers in charge, has made the following description of the engineering features of the work:

"The canal, as it will be completed, will have an upper pool about half a mile in length which will be maintained at the level of the river at Celilo, with a pair of guard gates at the upper end of this pool. For 6800 feet below Celilo Lock the canal is in solid rock excavation, the surface of which for the greater part of the distance is below the level of the limiting stage of high water navigation, the river water being excluded up to that stage by means of a concrete wall.

"Openings in the river wall, at convenient points, with their bottoms at the limiting stage of navigation, permit the river water to enter the canal and fill it before the river tops the wall. These openings will also regulate the extreme height of water in the canal. Below the rock section, for a distance of 6300 feet, downstream, the canal passes through a gravel bar with a sandbar at its lower end. The depth of the sand is 80 feet below canal grade at its lower end. This section is lined with reinforced concrete 12 inches thick and upward pressure against this floor is prevented by putting the lock at Ten-Mile Rapids in commission when the river stage is above level of the water in the pool below Celilo Lock, which pool will usually extend down stream to the lock at Five-Mile Rapids.

Part Dug in Solid Rock.

"From the west end of Ten-Mile Lock for a distance of 7000 feet the canal prism is in solid rock excavation and presents no special features, but in this stretch of canal the rock surface, for a mile in length, and from the river to the bluffs, is covered with shifting sand dunes, which have been 'drowned out,' so to speak, by a heavy blanket of rock from the excavation.

"Where the surface of the rock is below the limiting stage of navigation, the river side of the canal will have a concrete wall, the top of which will be about two feet above the limiting stage of navigation, and have openings to control the 'drowning out' of the canal.

"Below the above-mentioned rock section for a distance of about 11,000 feet, the canal passes through gravel bars, with rock reefs across the same, so that in places the canal section will be in rock. The ground surface for most of this distance is below the level of high water in the canal, and embankments will be used to form the canal section above the natural surface of the ground. A reinforced concrete lining will be used, where the canal is in sand and gravel.

"To control the flood waters and regulate the water level in the pool below Ten-Mile Lock, a number of openings are to be left in the river wall.

"The sandbar ends at the head of Five-Mile Rapids, where the canal enters solid rock and remains in rock excavation to the western terminus of the canal at Big Eddy, 9000 feet distant.

"Power boats will navigate the canal under their own power, and in order to facilitate the passage of boats going in opposite directions it is probable that an electrically operated system of semaphore signals will be used at the passing basins.

"The canal terminals at Celilo and Big Eddy will have a landing place in the river at the entrance to the canal. At Celilo a direct connection with the railroads and wagon roads is possible by means of an inclined roadway or track. At Big Eddy the transcontinental tracks are more than 100 feet above the low water of the river, and a direct connection with the boat landing would be difficult and unnecessary, for there will be no occasion to transfer freight from boat to rail or wagon at that point.

"It is estimated that the canal will be in operation at least ten months annually. From the records of river readings it appears for a period of 26 years the river was above the limiting stage of navigation an average of 20 days annually, with a maximum of 66 days in 1880. During the 26 years it failed to reach the limit of navigation eight times.

"The navigation of the river is likely to be sus-

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pended by ice during the winter months. Ice blockades generally occur in January and do not usually cover a period of more than three weeks. During the ice period the river is generally at a very low stage and navigation on the Snake River is usually suspended on account of low water, and navigation is then limited to the Columbia River between Celilo and Priest Rapids.

"It is estimated that about two hours and 50 minutes will be required for the passage of a steamboat through the canal, moving at the rate of four miles an hour through the pools."

In the great public celebration which will mark the opening of the Celilo Canal, the river steamboat will take an important part. The Columbia was navigated by river steamers for years before the advent of the railroads and many of the fine old craft will appear side by side with the later stern wheelers. The early craft on the Columbia were fully abreast of their times and many fast trips were made up and down the river in the early days. The second vessel to be built in Oregon was the side wheeler "Lot Whitcomb," a boat of the Mississippi River type, 160′ long, 24′ 0″ beam and 42′ 7″ over the guards. The "Whitcomb" was launched on Christmas day, 1850. She had a single cylinder engine of 17″ bore by 7′ 0″ stroke. Jacob Kamm, a steamboat engineer with experience on the middle west rivers, built soon afterwards a stern wheeler and placed her in commission on the upper Willamette. The advantage of this type of propulsion was quickly realized and soon became general on both the Columbia and the Willamette.

EDITOR PACIFIC MARINE REVIEW:

Dear Sir:—We note a very interesting article on "Marine Feed Water Heaters, Closed Type," by Mr. C. F. Braun in the February, 1915, issue of PACIFIC MARINE REVIEW. In connection therewith we would like to take issue with the author on the paragraph on page 32 quoted below:

"Another method which has been adopted is to use a double tube construction by means of which a thin film of water is maintained and heat applied to both sides. This method produces very effective results, but the construction is not a simple one, the tubes are difficult to clean, and the actual efficiency of the inner steam tube is so low as not to warrant its cost."

Also paragraph on page 37 quoted below:

"Another factor which should not be overlooked is the mechanical energy required for forcing the water through the heaters. This, in good designs, is almost negligible, amounting to only say 5% of the total work required of the feed pumps. But with careless design or one involving the use of double tubes, the frictional resistance may be so high as to materially burden the feed pumps. A heater rating should, therefore, include frictional resistance to the flow of the water."

We have been manufacturing the double tube type of heater to which the article refers for several years now, and we are having uniform success.

Referring to the matter of increased efficiency, we might advise that on test made at the U. S. Naval Academy we have attained as high as 1226 B. T. U. transmitted per square foot per hour, per one degree temperature difference. Further, it has been found in actual practice that it is a very simple matter to keep these tubes clean, and we would also like to have the privilege of demonstrating to the author the simplicity of construction. We have now a large number of customers who give us repeat orders. We would cite in this instance the Pittsburg Steamship Company, which company in the last fourteen months has ordered thirteen heaters after having tried out one on their steamer "Filburt" for a period of three years.

Referring again to the matter of cleaning, with the heaters as we have them designed, owing to the constant expansion and contraction of the corrugation in the tubes and to the high velocity at which we carry the water, this has been rendered almost unnecessary. We have had these heaters in operation on the Lakes for periods of six years without any clogging up. We think this latter fact speaks for itself, as it is well known that the Lake water is very highly charged with various limes.

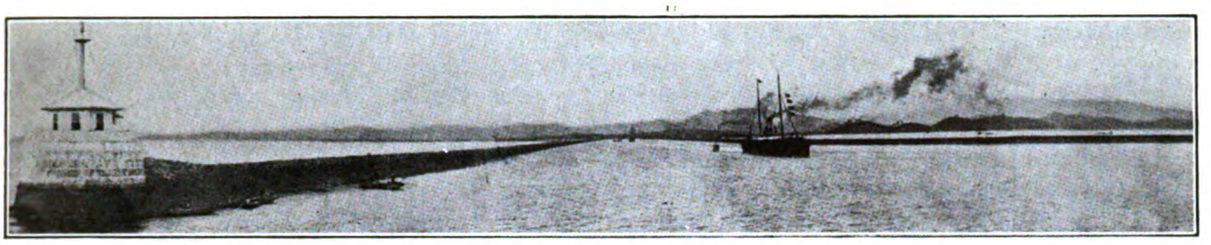
We now refer to the last paragraph of the article, on page 37, which we have quoted. The U. S. Navy specifications call for their feed water heaters to have a frictional resistance not exceeding 10 pounds, and we wish to advise that we have no difficulty in easily keeping within the amount specified. In fact, the pressure due to frictional resistance imposed on the pump rarely exceeds 5 pounds, and more often is from 1 to 3 pounds, so that considering the total pressure against which the pump is operating (on such jobs as U. S. battleships) as being approximately 200 to 210 pounds, this figure is a long way below the 5% total which the article specifies as being necessary with good designs.

Yours very truly,

SCHUTTE & KOERTING COMPANY.

Mr. DeCourcy May, chairman of the Board of Directors of the New York Shipbuilding Company, spent a few days in San Francisco looking over the Exposition, during the early part of April. Another visitor about the same time was Mr. Frank Kirby, the Naval Architect, whose work in connection with the development of the Hudson River type of boat, is exemplified in the "Hendrik Hudson" and "Washington Irving."

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New York Notes

For the first time in the history of the United States the flow of immigration has been turned back toward Europe and more aliens are now leaving this country than are coming here to make their homes. The heaviest emigration was shown among aliens from Southern Italy. Of these 76,629 more departed than were admitted during the seven months ended with January. This presumably was due to the calling of Italian reservists back to the colors.

A request for an increase in wages of approximately 33 1-3 per cent. for deck officers on all American steamships operating from the Atlantic Coast has been made by the Neptune Association of Masters and Mates. The request was made in the form of a circular letter addressed by Robert H. Cowan, secretary and counsel of the Neptune Association, to the operating heads of all American steamship companies with offices in New York and other Atlantic coast cities, and asks that an adjustment be reached by May 1, 1915.

"We are asking," explained Mr. Cowan, "that the lines give deck officers the following minimum wage: Masters, $200; chief officer, $125; second officer, $100; third officer and all other deck officers, $90. At present, some masters receive only $130 a month, while the general scale for chief officers is $90; for second officers, $70, and for third officers, $60."

According to the text of the circular sent out by Mr. Cowan the Neptune Association has a membership of 889 licensed masters and mates of ocean steam vessels and that in a referendum vote taken among the members, only seven were against asking for the new scale of wages. There is no spirit of aggression shown in the letter and no intimation is made in regard to what course will be pursued by the association in the event of the steamship lines showing an unwillingness to concede.

Considerable interest has been aroused in the announcement that a new steamship line is to be established by the Atchison, Topeka & Santa Fe Railroad to operate in competition with the service of the Southern Pacific Railroad between New York, New Orleans and Galveston.

The establishment of the new line is in the hands of an Eastern syndicate, it is said, which is headed by Paul T. Bruyere, of the Bush Terminal Company of New York. An option is reported to have been obtained by the syndicate on a mile of deepwater front at Galveston, where terminals to cost $2,000,000 are to be erected.

The demand for sail tonnage has caused owners to take their vessels out of storage somewhat earlier than usual this season, and practically half the fleet was ready to be placed in commission by April 1. Shipyards in Maine, Massachusetts and Rhode Island have enjoyed a highly prosperous season in fitting out the vessels, and many schooners which, under ordinary conditions, would probably have been laid up for good, have been reconstructed and placed in commission.

Arrangements are being completed for furnishing fuel oil to vessels at the two entrances to the Panama Canal, the facilities already being adequate to meet all existing demands. The trade will be handled both by the Government and private parties, thus insuring conditions which should prove advantageous to vessel owners.

Balboa, the principal point of loading, already has storage facilities for 220,000 barrels of fuel oil and 37,000 barrels of Diesel engine oil. The fuel oil is held in two 42,000-barrel tanks belonging to the Panama Canal, three 37,000-barrel tanks belonging to the Union Oil Company of California, and one 25,000-barrel tank of the Panama Agencies Company.

The market in Diesel engine oil is in the hands of one firm at present—the Union Oil Company, but other companies are preparing to enter the field. The Roxana Petroleum Company expects soon to begin using two 55,000-barrel tanks which were recently completed.

At Cristobal the fuel oil storage at present is 195,000 barrels. The Union Oil Company of California has erected three tanks each of 37,000 barrels capacity, and the Panama Canal has two tanks each of 42,000 barrels capacity. No Diesel oil is being sold as yet at Cristobal.

The Seeberg Steamship Company, a recently

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formed corporation of Mobile, Ala., has announced the appointment of Alfred Clegg, who was assistant in charge of the Brazilian department of Funch, Edye & Company, as manager in charge of the Mobile office. Mr. Clegg is succeeded with Funch, Edye & Company by R. H. Blake, formerly with the American-Asiatic Steamship Company.

The Mallory line steamship "Denver," abandoned in a leaking condition in mid-Atlantic on March 24th, is to be replaced by a new and larger vessel. The contract for the new vessel has been let to the Newport News Shipbuilding and Drydock Company, according to H. H. Raymond, vice-president and general manager of the Mallory line, and the time for completion is given as September 1, 1916. She will be of 4000 tons net register, 440 feet long and will cost approximately $900,000. It is contemplated using the new craft in the New York-Galveston service.

Universal regret was expressed in maritime circles throughout the world at the sudden death from heart disease in a hotel at Atlantic City on March 24th of Morgan Robertson, inventor, poet and author of sea tales. As versatile as his career was strange, Mr. Robertson did not achieve wide fame for his writings until the last few years. He was born in Oswego, N. Y., sixty-five years ago and ran away to sea when a boy, serving before the mast for more than ten years. Tiring of the sea he became a watchmaker, then a diamond cutter and had lately turned his attention to submarines, for which he invented a number of mechanical devices. Among the best known of his writings are "Shipmates," "Down to the Sea," "Land Ho," and "Spun Yarn."

Representatives in New York of Furness, Withy & Company, Limited, have announced that the firm has decided to set aside out of the profits the sum of $50,000 for division among the masters, officers and engineers of their own steamers and steamers under their control. The money is to be divided by the Board of Directors, in their discretion, as recognition over and above the increase of wages recently granted, of the extra strain and vigilance necessary in consequence of the war.

Puget Sound Navy Yard has been awarded the contract for building four Scotch marine boilers for the transport "Warren." The "Warren" will not go north to have the new boilers installed, but they will be shipped to San Francisco on the "Dix." The price of the boilers is $31,500.

The Portland Flouring Mill is building an extensive bulkhead along its river frontage preparatory to making extensive enlargements of its mills.

INDEPENDENT WIRELESS.

The Pacific Alaska Navigation Company has purchased three sets of radio telegraph outfit from the Kilbourne and Clark Manufacturing Company and installed same on three of their steamers, the "Admiral Dewey," "Admiral Farragut" and "Admiral Schley." The new apparatus replaces Marconi outfits. This action on the part of the Pacific Alaska Navigation Company is an innovation that is being watched with great interest by other concerns. As far as the apparatus itself is concerned the result has been a splendid success, the three ships having established distance records for daylight messages. Noise has been practically eliminated from this type of wireless and there is no more sound from its operation than from an ordinary telegraph instrument. Aside from the excellence of the Kilbourne and Clark apparatus, the management of the steamship company was influenced by the possibility of obtaining a much higher efficiency of operation through the merging of its own radio department into the ship's organization.

SMALLER YARDS BUSY.

The John W. Sullivan Company of New York has under way a steel tug for the Central Railroad of New Jersey, the hull of which is being built at the New Jersey Dry Dock Company's yard, Elizabethport, N. J.

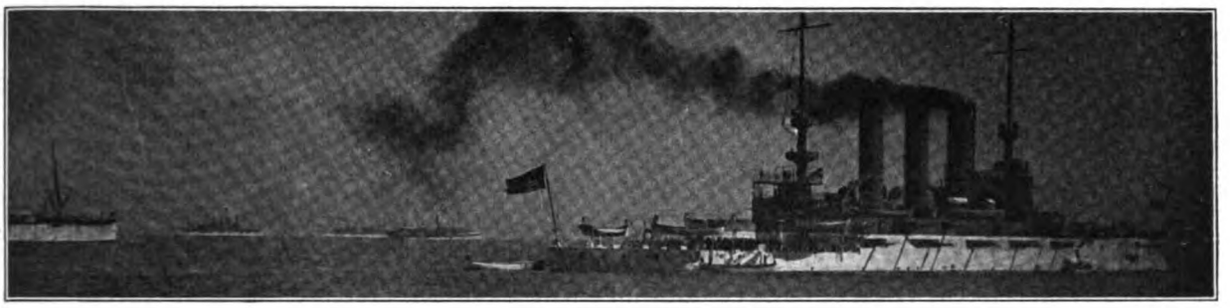
The Jackson and Sharpe Shipyard of Wilmington, Delaware, has a contract for four large barges for P. Dougherty of Baltimore. These barges will be about 300 feet long and have a capacity of between 1200 and 1400 tons. A seagoing barge 250 feet long, 40 feet beam and 16 feet molded depth is being built by the William E. Woodall Company for the same owner.

The Manitowoc Shipbuilding and Dry Dock Company of Manitowoc, Wisconsin, has an order from the Goodrich Transportation Company of Chicago for a 300-foot passenger steamer.

Mr. E. J. M. Nash, who is widely and favorably known in San Francisco and elsewhere up and down the coast through his connection with the Royal Mail Steam Packet Company as general Coast agent, is now on the firing line in northern France. Mr. Nash received a commission as captain in the new English Army which was recently moved to France.

The "Senator" of the Pacific Coast Steamship Company's southeastern Alaska and Bering Sea service left Seattle for the north on April 7, after painting and overhaul on the dock of the Seattle Construction and Dry Dock Company.

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European Marine Notes

[From our own Correspondent.]

London, April 10th, 1915.

Shipping and the War.

The British shipowner is just now turning his attention to the River Plate market as the bright spot which stands out in relief among the various fields for employment which are spreading their attractions before him. After a brief reaction this market is again offering high remuneration, which shows signs of becoming higher, provided the shipowner does not display a too great anxiety to seize what is offered him. One of the chief assets of the shipowner on this side is a certain coyness, which leads him to affect a lack of interest in any choice freight which not infrequently results in its becoming choicer. This is, of course, a characteristic of all who have a conveyance to let, and is not confined to shipowners. The owner of a livery or stable or a large motor garage is frequently infected with a similar desire to improve upon the hire offered him, while house agents have been known to show the same symptoms. To resume, the demand for steamers from the River Plate has run well into May loading, for which position $17.50 per ton can be obtained, from San Lorenzo to the United Kingdom. For June loading the rate is now about $16.84, a rise of $1.25 per ton within a week. From North America the Hudson Bay Company are still the principal operators, and, this company's desires being rather insistent, there seems to be an intention on the part of other shippers to let them have a run and not cause rates of freight to rise by competing. Consequently they have been able to secure steamers to carry wheat to France at $2.50 per quarter, while they are paying $1.84 per quarter for the transport of oats. Nevertheless, it is expected that eventually this market must pay higher rates when other charterers come into the market with their requirements. The shipment of cotton has ceased to a large extent for the present, but a larger demand for this commodity on the part of the Allies is anticipated presently. At the same time, in many shipping quarters there is a feeling that rates of freight may go lower before they become better, and this may easily be the case.

Carrying the Grain Supplies.

The demand for steamers to carry grain to this country, while it has not so far increased, remains steady, and it is quite probable that more inquiries will come into the market soon. It is expected that this country will draw more of her supplies from Montreal as soon as the Canadian ports are open, and for some time past merchants have been seeking steamers to load in May. At the same time they have not so far been able to offer rates of freight which will compare at all favorably with those offering from other exporting centers. It costs more, in port charges and other expenses, to load a cargo of grain in Montreal than it does from ports in the Northern United States, and shipowners therefore expect to receive a proportionately higher freight to cover the increased cost. As soon, however, as shippers are really forced to charter steamers to carry the cargoes for which they have committed themselves, there is no doubt that these rates will rise to a parity with those from other ports. While discussing the question of freights to the United Kingdom, it is a curious fact that the question of danger from enemy submarines rarely seems to enter into the shipowners' arguments. The principal factor is the scarcity of tonnage, and in a curious way the submarine activities actually make business better for those owners whose steamers survive or avoid the attacks.

Where the Money Goes.

A friend who is on the Baltic told me that it is the Greeks who at present are making money out of the war. A vessel built at Sunderland and now owned by a Greek shipper recently made a voyage from Charlestown, U. S. A., to Rotterdam, with a cargo of cotton. The gross profits on the one voyage exceeded $175,000, which meant at least

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$150,000 net. And the original cost of the vessel was less than $350,000.

Dearer Shipbuilding Materials.

A further advance recently of $2.50 per ton in the price of steel plates, to $45 per ton, makes a total increase of $15 per ton since the commencement of the war, and, coupled with a corresponding movement in other raw materials used by shipbuilders, together with higher wages has exercised a marked effect upon the cost of constructing new tonnage. Thereby another factor has been added to the many previously existing which have helped to bring about the present high level of freights. Naturally shipbuilders, and also shipowners, are eagerly discussing the position which is likely to arise after the war is over, and the general opinion appears to be that sufficient business will then accrue, both for freight and new constructions, not only to compensate for an absence of any further pressure on Government account, but also to maintain shipbuilders' and shipowners' profits. The argument generally in favor is that the countries wherein fighting is now taking place will be so depleted of foodstuffs and other articles that they will have to import from overseas an unprecedented quantity of the bare necessaries of life, for which purpose not only will all the tonnage now available be required, but more as well. Whether matters develop precisely on these lines or not, there can be no doubt that the volume of overseas trading should tend to improve rather than otherwise, as the war progresses, and this alone would justify a considerable amount of activity at the shipyards—so long as Germany's merchant fleet is held up. As a matter of fact, however, few shipbuilders are in a position to undertake new construction with any freedom at the moment, in view of the powers which have been granted to the Government to acquire all works and plant capable of providing munitions of war, under which heading most shipyards undoubtedly come, the probable result being that a large amount of new shipbuilding will be held up for an indefinite period. The position would appear to be, therefore, that while iron and steel manufacturers are benefiting immediately from the rise in the values of those commodities which they produce, other trades and industries, and particularly shipbuilders, while also deriving some advantage from this factor, may expect a higher degree of participation hereafter.

Atlantic Passenger Fares.

For the first time for many years the Atlantic shipping companies have found it necessary to reduce their passenger fares in order to encourage some semblance of activity, the volume of this class of business having sunk, since the commencement of the war, to a very low level. Hitherto a "cut" in passenger rates has usually signalized the opening of a war between the companies, but there is, of course, not the slightest ground for suggesting any such development on the present occasion. The directors' sole object is to stimulate steerage business by the cheaper rates, but it is doubtful whether it will be achieved. More serious than any momentary consideration relating to steerage traffic on the Atlantic route is, however, the probability that the war has arrested for years the flow of emigration from Central Europe to the United States and Canada, and, having regard to the very large amount of capital which has been invested in the construction of vessels specially adapted to this class of business, the matter is one which calls for the very careful consideration of the principal Atlantic shipping companies. Doubtless this special tonnage can be adapted to other purposes, and one would imagine that it would be as well if such changes as are necessary in this connection were undertaken without delay, for there is little to be gained by waiting, while conceivably, if the companies can decide as to the class of trade for which they should specifically cater hereafter, the sooner they adapt themselves to the new conditions the better will it be for their shareholders. Support is lent to this view by the fact that the demand for freight-carrying vessels is at present far in excess of supply, and it is possible that some of the Atlantic boats, originally built mainly for emigrant transport, would pay for conversion into cargo boats. Certainly it is difficult to see to what other purpose they can be put just at present.

Austrian Shipbuilding.

At the last board meeting of the Austrian Lloyd Herr Frankfurter, the managing director, stated, according to reports which have reached the Hamburg newspapers, that although the war had brought Austrian shipping to a complete standstill, his company would proceed with the shipbuilding program upon which it had already embarked. The company had under construction at its own yard four passenger steamers intended for the Indian trade and the same number of cargo steamers, each of 12,000 tons carrying capacity, for the East Asiatic services, which would be finished during the current year. They would then be held in readiness for use immediately after the conclusion of peace when a great boom in maritime traffic might be anticipated. Herr Frankfurter also stated that the Austro-American Company was continuing its shipbuilding program without any alteration.

Shipbuilding in Germany.

While the German steamship companies are showing the effect of the war by reducing their dividends or withholding their small surpluses al-

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together from distribution the shipbuilding yards are enjoying a mild boom. The Vulcan Shipbuilding and Machinery Works of Bremen announce that last year's dividend of 11 per cent. is to be repeated. But of the profits the sum of $401,166.85 is written off for depreciation, as compared with $237,188.55 for the preceding year; $17,625 are set aside for a "war reserve," and the sum of $23,168.65 is carried forward to new account. The J. C. Tecklenborg Company of Geestemunde also repeats its previous year's dividend of 10 per cent. on its capital, which was increased early last year by $235,000. A considerable amount it is stated has been set aside for depreciation and reserve.

American Trade With India.

Vigorous efforts are being made by commercial interests in America to secure a substantial share of the trade in Indian produce hitherto controlled by German and Austrian firms. A direct steam service has been arranged from Rangoon to New York for the transport of rice, while the interests involved in this have secured a lease of some of the rice mills which are in "enemy" ownership, and thus ensure a rice supply for their vessels. A large proportion of the rice demand for South American ports hitherto has been controlled from Hamburg, and the energies of North American houses are being directed to the task of devising new trade routes which will result in a permanent diversion to themselves of a share in these German interests. Apart from this, it is being recognized in India that the suspension of the demand, not only by enemy countries but by neutral states in Europe, involves the necessity for discovering new markets if India is to continue a solvent buyer of British manufactures to the normal extent.

New Type of Oil Tank Steamer.

Presiding at the annual meeting at Glasgow, of the British Corporation for the Survey and Registry of British Shipping, Robert Clark said that probably the most novel shipbuilding development last year was expressed in the three oil-carrying steamers "Aztec," "Breifond," and "Ricardo A. Mestres." The oil in these vessels was carried in large steel cylinders having diameters from 4 ft. to 5 ft. less than the breadth of the ship, instead of in ordinary compartments. The bottoms of the cylinders were closed by the ordinary double bottom plating. The tops were partly closed by the upper deck, but the central part was open to a trunk running fore and aft, subdivided so as to make a complete tank of each cylinder. The cylinders themselves did not require any stiffeners on their plating, and the arrangements of the structure were such that the ships could be converted into ordinary cargo steamers by simply removing the cylinder walls. Mr. Clark said that they had recently been informed that these vessels were so far an unqualified success, a remark which could not be made unreservedly about every bulk oil carrier of the more ordinary type. Their future history would be a matter of much interest. The largest ship with which the society was associated during the year was the "Tuscania," built for the Cunard service, a ship of 14,348 tons, fitted with geared turbines, while two 23-knot geared turbine vessels, the "Princess Margaret" and the "Princess Irene," had been built for the Canadian Pacific Company's Vancouver trade.

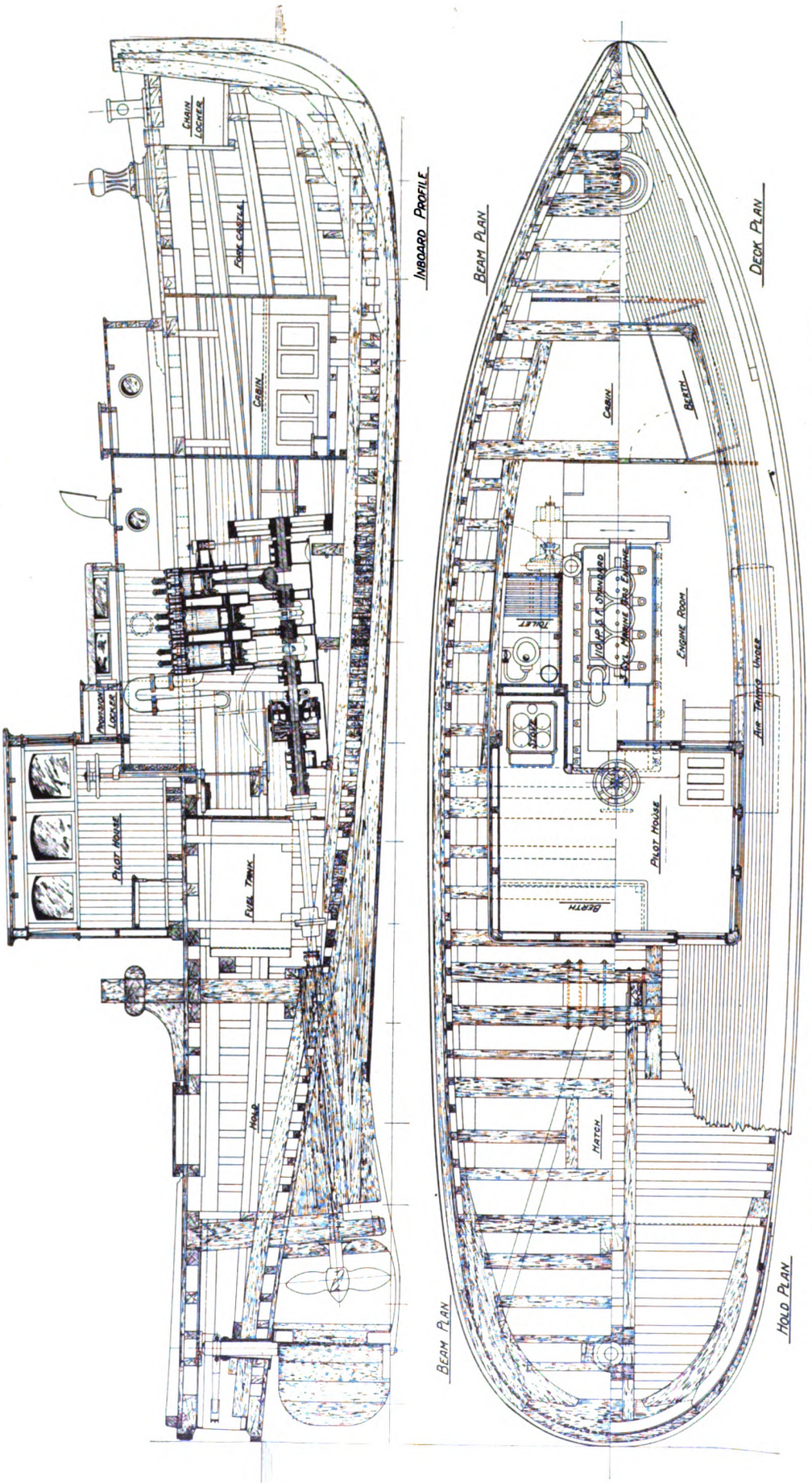
Among the interesting applications of the semi-Diesel type of engine made recently in continental Europe, despite the war conditions, is the 160 horse-power Kind Diesel type reversible motor installed in the cargo vessel "Comercio de Esquina" built at the Cantiere Navale di Chiavari near Genoa and intended for the freighting business on the Rio de la Plata. The general dimensions of this handy little freighter are 90′ 0″ between perpendiculars, 23′ 0″ beam, draft loaded 6′ 6″, draft light 3′ 6″, displacement loaded 300 tons. Another interesting application of the Kind motors is found in their use as motive power on Italian launches. The accompanying illustration depicts one of the picket boats of the Italian dreadnaught "Giulio Cesare" equipped with a 100 horse-power Kind motor.

The American consul at Barbadoes reports that on March 17th, for the first time in the history of Barbadoes, two American merchant vessels were in the harbor on the same day. One was the "San Francisco," bound from Buenos Ayres to New York with the largest cargo of coffee ever brought into New York by a single steamship, and the other was the "Crofton Hall," bound from New York to Montevideo and Buenos Ayres with passengers and freight. Both vessels are owned by the United States Steel Products Company and were recently changed from British to American registry.

The PACIFIC MARINE REVIEW is in receipt of a request for back numbers of the magazine from the Library of Congress, Washington, D. C., and a request that an advertisement be inserted in our columns to the following effect:

We need volumes one and two and the copies of April and August, 1906; August, 1908; December, 1912; all numbers of 1913, and January, 1914. Any one possessing one of these magazines will confer a favor by forwarding same to Herbert Putnam, Librarian of Congress, Washington, D. C.

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Profile and deck plan of towboat for the Rio Vista Launch and Barge Co. D. W. and R. Z. Dickie, naval architects

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A New Grain-Handling Outfit

A NEW barge and gasoline tow boat is now under construction at local yards for use on the Sacramento and San Joaquin Rivers, from plans by D. W. and R. Z. Dickie, Engineers and Naval Architects, of San Francisco, for the Rio Vista Launch & Barge Co.

The barge is of the general type built for river use, with easy runs, and will be built of Puget Sound pine generally with cedar sheathing on the deck.

The barge is a cross between the usual frame built barge and the barge with the solid sides, with three solid center bulkheads, edge bolted clear to the ends. In the usual river barge, the sides are made three inches thick and simply spiked to the frames, but on this barge the sides are 4″ thick and edge-bolted with ¾″ edge bolts, besides being bolted to frames. Between the bulkheads and the sides are fitted the usual stanchions and stringers, while eight trusses are fitted with top and bottom members bolted clear across the barge.

The general dimensions are as follows:

Length over fantail, 136′ 8″.
Length of hull, 130′ 0″.
Length of fantail over guard, 6′ 2″.
Breadth over planking amidships, 34′ 0″.
Breadth over guards amidships, 35′ 0″.
Breadth over planking at the ends, 30′ 0″.
Breadth over the guards at the ends, 31′ 0″.
Size of living room, 16′x28′.
Size of pilot house, 7′x8′.
Maximum draft in fresh water, 6′ 8″.
Freeboard loaded, 1′ 10″.
Depth from top of deck to bottom of plank, 8′ 6″.
Cargo, 500 tons.

On the forward deck, as shown on the drawing, is the mast which carries a 35′ boom to be used for handling heavy weights, the fall from which will be handled by a 9 H.P. San Francisco Standard Gas Engine Co. hoist.

In the deck will be fitted in cast iron sockets, with covers which can be fitted with posts to make a fence for the carrying of sheep or cattle. The accommodations aft for the crew of stevedores and the skipper will be fitted up somewhat better than is usual in barges of this class, as it is the intention of the owner to make the men as comfortable as possible.

Steel clothes lockers will be used and an effort will be made to raise the standard of the men who handle the season's crops.

The cooking stove in the living room will have a galvanized iron hood fitted over it with a special ventilator casing around the stovepipe and Liverpool hood above.

A shower bath will be fitted on the fantail on the barge, the water for which will come from tanks located on the roof, and filled by a hand pump which will have its suction in the river.

There will be a No. 6 Hyde Power Capstan forward for handling the anchor, and a Hyde Crank Capstan aft for handling the stern line.

Three rudders will be fitted and only the center rudder stock will be carried up under the living house—the other rudders being linked to the middle rudder below the fantail.

A long tiller will be fitted on this rudder and connected to the steering wheel and pilot house by means of a steel steering cable.

The contract for the construction of this barge was awarded to D. J. Hanlon of Oakland, he being the lowest of the bidders, and she will be ready for service by June 15th.

The following were the bids received:

D. J. Hanlon	$ 9,840.00
W. S. Brusstar	9,950.00
Johnson & Lantari	10,775.00
Schultz, Robinson & Schultz	13,174.00
H. Anderson	14,033.00
W. G. Tibbetts & Co.	15,720.00

The new tug boat is to be a single screw boat with a single deck, and a combined cabin, engine room and pilot house. The engine house is high enough to give head room in the engine room, and the pilot house aft of the engine house, with the entrance from the pilot house into the engine room.

The model is of the straight stem torpedo stern type with a chock at the bow and the stern extending about to the house with 1″ ironbark on top around stern. Guard is worked all around.

The engine is a 110 horsepower three-cylinder Standard Marine gas engine, 11¾″x15″, turning 250 revolutions per minute.

The steering gear is of the Standard auto type with the engine reverse and the steering gear led to one stand in the pilot house.

Joiner work is plain and serviceable, of Pine T. & G. painted.

The forward deck is fitted with a capstan and the towing bitt is of cast iron of the towboat type. On the forward deck a cast iron niggerhead bitt is fitted.

The general dimensions are as follows:

Length over all, 60′ 0″.

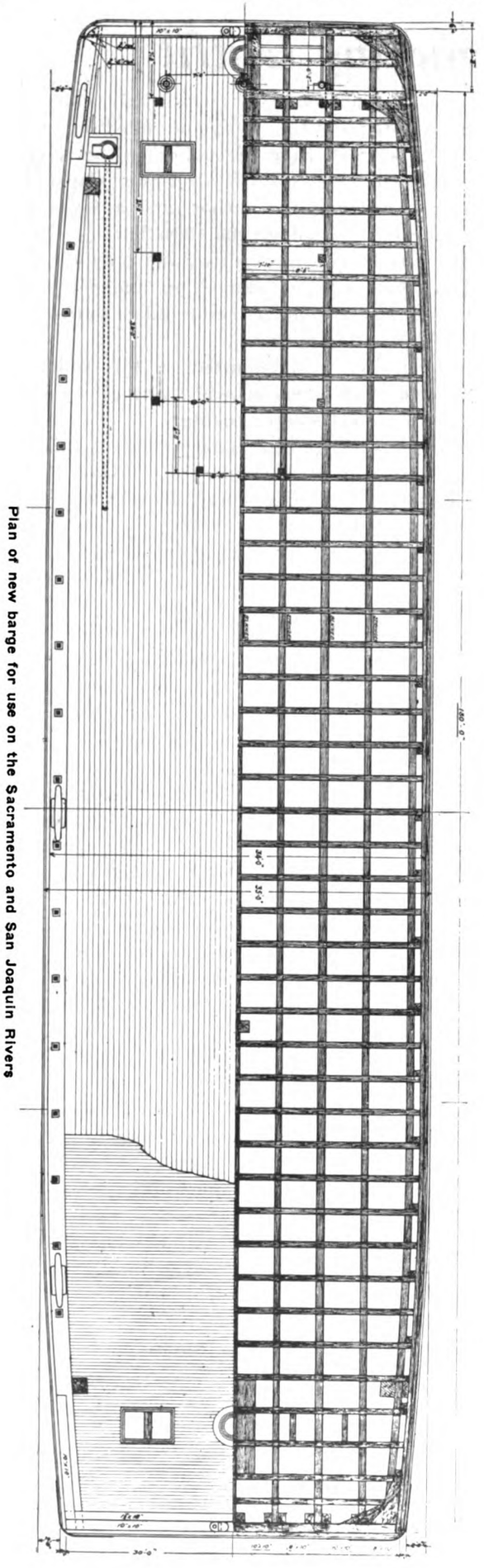
Length from the rabbet of the stem to the inside of the guard at the stern, 58′ 8½″.

Length from the rabbet of the stem to back of the sternpost at the shaft, 50′ 8″.

Length from the rabbet of the stem to the back of the rudderpost, 55′ ½″.

Displacement length, 60′ 0″.

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Plan of new barge for use on the Sacramento and San Joaquin Rivers

Beam molded at the waterline, 13′ 11½″.
Beam over plank at the waterline, 14′ 3″.
Beam over guards, 16′ 0″.
Beam molded at the deck, 14′ 8½″.
Beam over plank at the deck, 15′ 0″.
Crown of beam amidships, 2″ in 15′ 0″.
Draft forward at the forefoot, 5′ 3″.
Draft aft at the skeg, 5′ 10″.
Mean draft rabbet for displacement, 5′ 0″.
Freeboard at the lowest point of sheer, 3′ 3″.
Sheer forward, 2′ 6″.
Sheer aft, 3⅜″.
Depth of hold, 6′ 9″.

The keel is to be of Puget Sound pine 10″x12″ with 1½″ ironbark shoe, and the rudder post will be carried by a steel casting connecting it to the sternpost and keel.

In order to give quick handling qualities, it will be seen by the plans that the skeg has been considerably cut away and the keel sprung up about 3″ in the length of the boat. The stem is of oak and the sternpost of ironbark, and a fairway piece fitted on both sides of the propeller.

The frames are all of oak 3¾″x3″ at the head, and 3¾″x4″ at the heel, and instead of ceiling, stringers will be fitted of pine, which will extend the full length of the boat and clinched through every frame. These stringers are made double, of 4″x4″ material.

A steel stern is shown on the plan, but this is to be supplanted by a stern built up of cedar fletches 3″ thick and sawed to shape, as it has been found that in warm climates where the boat will operate, the ordinary stern would rot very quickly. The rimpieces are to be made of Jenisero.

The forecastle to be fitted as a boatswain's locker and will be entered from the forward cabin, with a chain locker built in the fore peak.

The forward cabin is to be arranged with one berth on each side, with lockers below and an escape hatch on the roof.

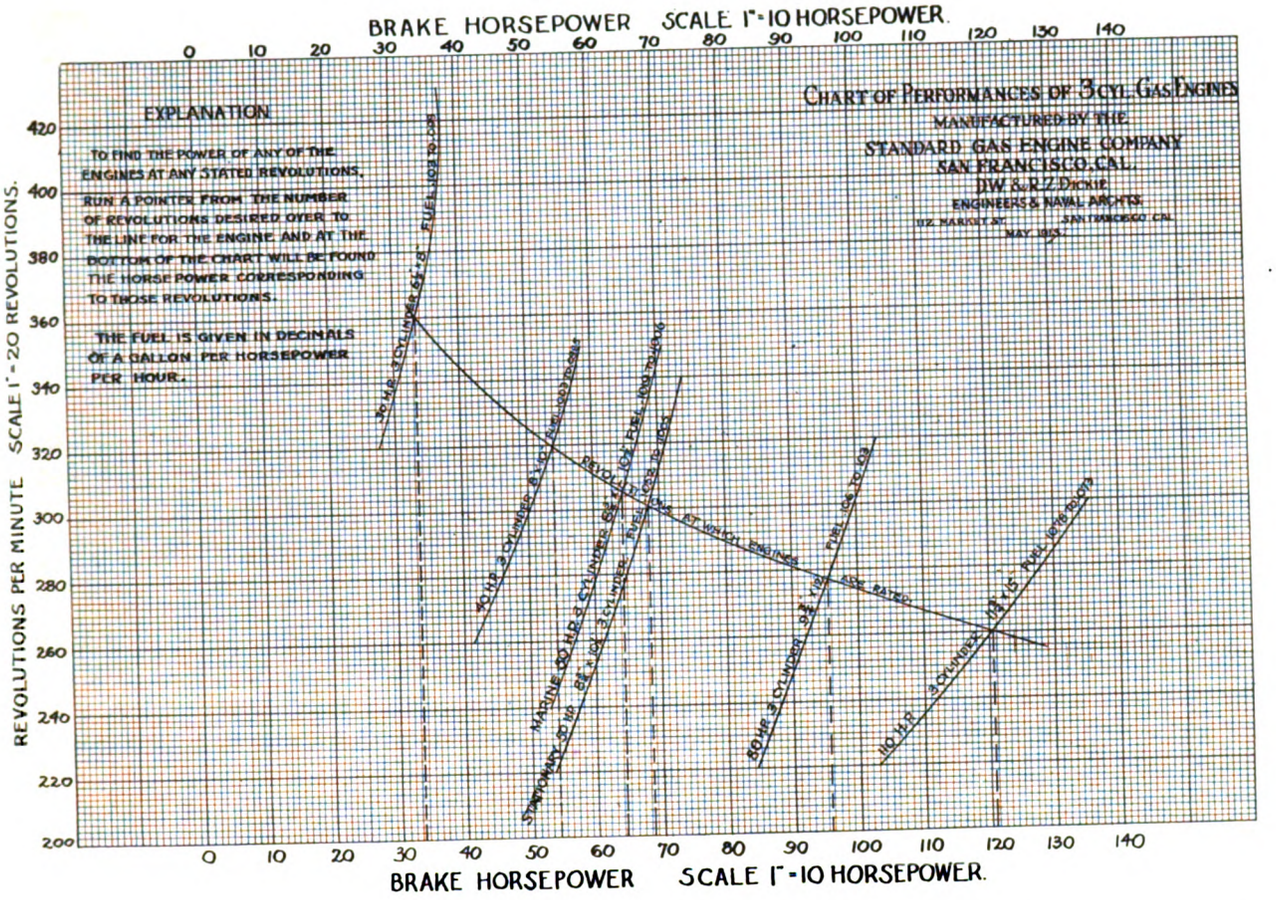
The engine room will be large and contain several lockers and a toilet.

The pilot house will be on deck with a platform in it for the man at the wheel, and will contain a cook stove built in a raised section above the pilot house floor. This will enable the man at the wheel to cook his own meals and handle the boat at the same time.

The engine, which was taken from the stock of the Standard Gas Engine Company, is to be of the 3-cylinder type, 110 H.P., 11¾″x15″, which gives the following results on test:

R.P.M.	H.P.	FUEL.
210	102.5	Fuel consumption varies
220	107.5	from .1077 to .0967 of a

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230	112.0	gallon per horsepower,
240	116.1	per hour.
250-rated	120.5	Approximately, 1/10 gal.
260	124.2	
270	128.1	
280	132.0	
290	135.2	

The main fuel tanks are under the pilot house floor with a capacity of 800 gallons. On the port side forward is a 6" "Dow" Centrifugal Pump driven by means of a friction pulley, which can be pressed against the flywheel of the main engine. This pump can be used for flooding or pumping out barges, and is of the size required by the Underwriters.

A complete electric light plant is fitted with the generator driven from the main engine, and an 80 Ampere Edison storage battery with the searchlight on top of the pilot house.

The boat is to be ready for service about June 15th, and will be plain but serviceable in every way.

The hull is being constructed by H. P. Anderson, a well-known boat builder of San Francisco, and the bids on the vessel were as follows:

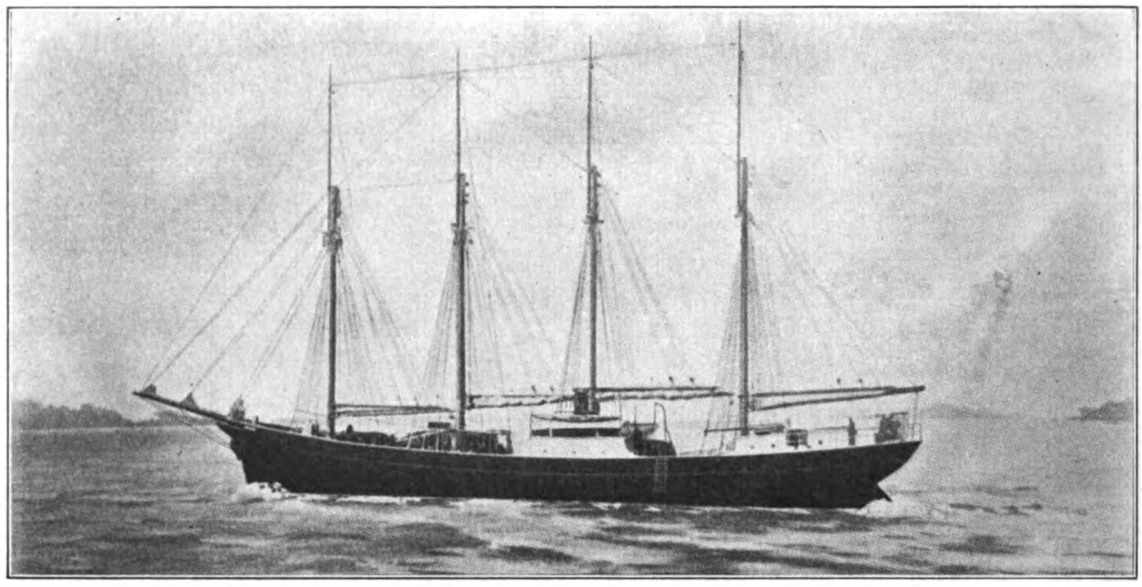
H. P. Anderson, San Francisco.....$4,485.00
Stephens Bros., Stockton, Cal..... 4,850.00
Wm. Cryer, Oakland, Cal..... 5,681.00

AUXILIARY CARGO MOTOR VESSELS.

CERTAIN shipowning firms are clearly realizing the great possibilities of the auxiliary type of craft for cargo carrying, and numbers of sailing vessels have in the past few years been equipped with oil and paraffin engines. It is clear that the results obtained with such boats have been equal to anticipation, since some of the firms whose old sailing ships have been so fitted are now building new sailing ships in which motors are to be installed during construction. A more satisfactory installation can be effected in this way, and it is quite possible that the auxiliary will compete very strongly with the full-powered craft in course of the next ten years. These auxiliary craft are much more suitable for long voyages than for short coastal trips, since the sails can be hoisted and kept up for days on end in the event of a favorable wind, although it is often not worth while to take advantage of the wind for a few hours. Whilst, therefore, auxiliary power is very desirable for ships making ocean voyages, it does not follow that vessels of similar size used solely in home waters would have the same advantage with sails.

A good example of a specially-designed auxiliary is the motor schooner "Hjalmar Sorensen," built at Stuhr's shipyard at Aalborg, which has just completed her trials. She is for Mr. F. L. Knakkergard, of Nyjobrug, Denmark, who already owns two auxil-

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The "Morten Jensen," an auxiliary with a Bolinder engine that has proven a great success

iaries, the "Jens Riis" and the "Morten Jensen," of 137 tons and 337 tons (gross) respectively.

The new boat has a length of 165 ft., a beam of 33 ft., and a draft of 12 ft. 10 ins., with a d.w. capacity of 750 tons—quite a fair sized vessel and a noteworthy addition to the fleet of auxiliaries. Fuel capacity to the extent of 60 tons is provided, giving a range of from 8000 to 10,000 sea-miles at full speed.

A four-cylinder 240 b.h.p. Bolinder hot-bulb engine is installed, and on the trials a speed of 8.5 knots was attained under power alone. The engine is of the usual Bolinders type, and the exhaust is taken up a small funnel at the after end of the vessel. It is, perhaps, somewhat surprising that an underwater exhaust has not been adopted in this instance, as this would have advantages for various reasons. In fact, the employment of underwater exhaust with hot-bulb engines does not seem to have received the attention it deserves.

The "Hjalmar Sorensen" is to trade between Denmark and Brazil.

Two other large auxiliaries have recently been built for the East Asiatic Co., in each of which two engines of 160 h.-p. are to be installed.

The following contracts were placed with Bolinders Company recently:

Two Twin 50 B. H. P. direct reversible marine engines for the Macon-Atlantic Navigation Co., Macon, Ga., to go on a cotton carrying canal barge.

Two 75 B. H. P. 2-cylinder stationary engines Model "H" to be direct-connected to 50 Kw. 60-cycle A. C. generators for the Borough of Butler, N. J.

Two Twin 30 B. H. P. 2-cylinder direct reversible marine engines to go on a river vessel in Colombia, S. A.

One 100 B. H. P. 4-cylinder direct reversible marine engine to go in a water provision supply boat in New York harbor, placed by the Boston Provision and Ship Supply Co. of New York.

In addition to these some twelve engines have recently been ordered for Cuba in both marine and stationary types.

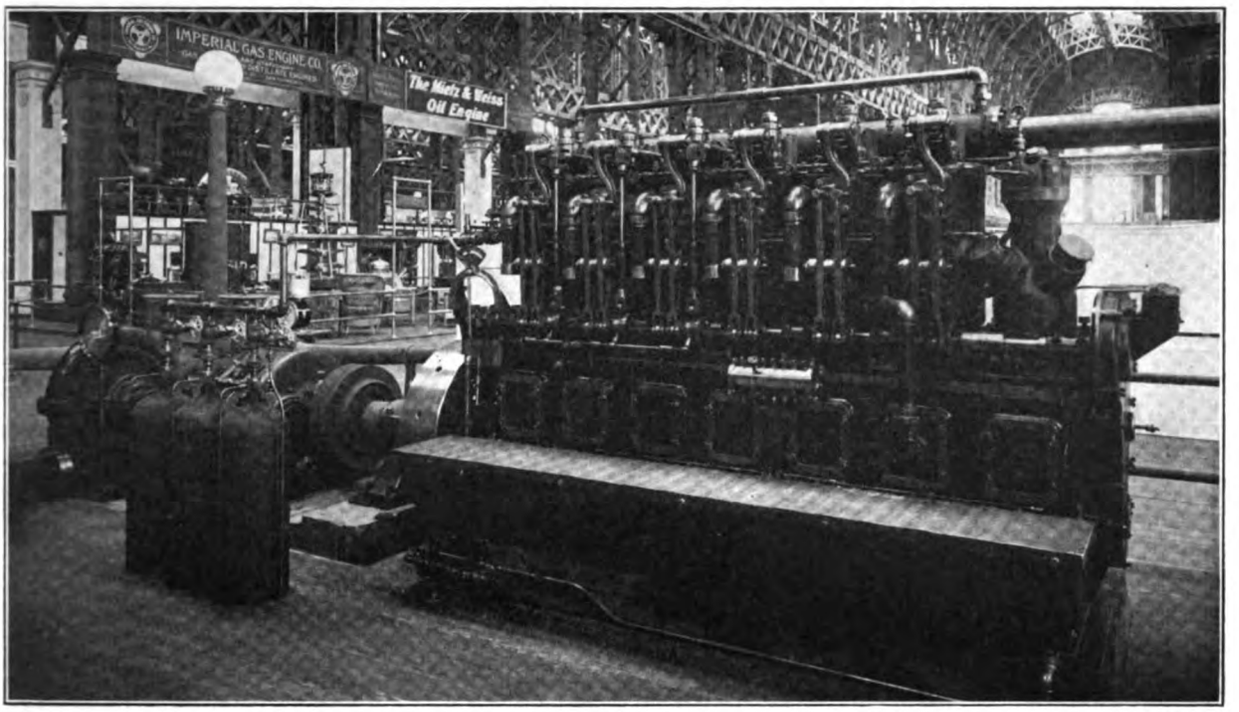
Practically all the sizes and types of Edison Mazda multiple lamps are affected by reductions in list prices that were put into effect April 1, 1915, by the Edison Lamp Works of General Electric Company. On the regular straight side and round bulb lamps, from the 10-watt to the 250-watt sizes, also on sign lamps, stereopticon lamps, etc., the reductions range from 3 to 20 cents per lamp, according to the size. These reductions, which average about 10 per cent., will tend to popularize further already popular lamps.

The new concentrated filament vacuum lamps of 25, 40 and 60-watt sizes now list at only 5 cents per lamp more than the regular lamps of corresponding sizes.

On the gas-filled, multiple lamp of 100 to 1000-watt sizes, the reductions range from 50 cents to $1 per lamp, the average reductions being between 20 and 25 per cent. The introduction of gas-filled lamps has been exceptionally rapid. Over a million are already in use. The decreased cost of these lamps will undoubtedly result in a still more rapid replacement of vacuum lamps by the more efficient gas-filled units.

The Lagonda Manufacturing Company of Springfield, Ohio, have just published a booklet entitled, "Lagonda Boiler Room Specialties." This booklet describes and illustrates their several types of boiler tube cleaners with latest improvements and boiler quick-repair tools. It also covers their automatic cut-off valve and multiple strainers. Copy may be had on request.

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The Nlseco engine exhibited at the P. P. I. E.

The Nlseco Exhibit

One of the interesting features of the machinery exhibits at the Panama-Pacific International Exposition will be found to be that of the New London Ship & Engine Co. of Groton, Conn.

This firm enjoys the distinction of being the first firm in the United States to manufacture Heavy Oil Engines working on the Diesel principle, and also of producing more H. P. to date than any other firm in this country.

The company was incorporated in October, 1910, and a license was secured from the Machinenfabrik Augsberg-Nurnberg A. G. of Germany, which gave them the rights, in the United States and possessions, to all types manufactured by the M. A. N.

The actual manufacture of engines was not started until the next spring when the works at Groton were completed, but since commencing work it has been found necessary to build two additions to the shop, and the amount of work turned out to date is as follows:

Eight 400 H. P. engines for submarines of the F class; four 300 H. P. 4-cycle engines for submarines of the E class; six 500 H. P. 2-cycle engines for submarines of the H class; sixteen 500 H. P. 2-cycle engines for submarines of the K class; eight 500 H. P. 2-cycle engines for submarines of the L class; four 300 H. P. 2-cycle engines for the Chilean submarines; one 300 H. P. Nuremberg commercial engine; two 150 H. P. Nuremberg commercial engines; two 450 H. P. Nlseco 2-cycle engines for submarine M-1; fourteen 180 H. P. 4-cycle engines for commercial use; ten 120 H. P. 4-cycle commercial engines; sixty 240 H. P. 4-cycle commercial engines; one 1000 H. P. 2-cycle engine for the submarine tender "Fulton." This company is also supplying the plans to the Government for building two 2500 H. P. Diesel engines for the U. S. fuel ship "Maumee," which will be the largest 2-cycle, single-acting Diesel engines in the world.

The company have on exhibition in the Palace of Machinery one of their 180 H. P. 4-cycle, single-acting, non-reversible engines. The engine is connected, through a Falk Speed Increasing Gear, to a single stage Pelton-Doble centrifugal pump. The water from the pump is used to operate a Pelton-Doble tangential water wheel, and the water wheel is directly connected to a generator.

The engine is essentially an American product, for although it contains many features that are to be found in European practice, the general arrangement of the different parts, and the simplicity with which the engine is operated, are peculiarly characteristic of American methods.

The bore and stroke are respectively 9 and 12½ inches, and the normal revolutions 350, at which speed the engine develops slightly over 180 H. P.

The starting of the engine is obtained by means of compressed air with starting attachments on three cylinders. As soon as started the remaining three cylinders begin to fire on oil, after which, when the starting gear is thrown out, the other three cylinders also begin to operate on oil.

Governing is obtained by means of a standard type of centrifugal governor driven off the cam-shaft, and controlling the fuel pump through a series of mechanisms.

An air compressor is placed on the forward end of

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FIREMAN'S FUND
INSURES HULLS, CARGOES,
HEAD OFFICE: CALIFORNIA AND SANSOME
JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON
G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.
FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

the crank-shaft, and is used for supplying the air for injecting the fuel, and for storing air for starting purposes.

This compressor is driven by a crank on the main crank-shaft, and has two compressing stages in tandem. It is capable of compressing air to 1000 pounds per square inch.

Two cam-shafts are used, one on either side of the engine geared to the main shaft. Large size cams are used for transmitting the motion to the valves.

The cylinders and head are cast in one piece, with the valve chests for the inlet and exhaust valves arranged horizontally. The spray valve is set vertical. This arrangement of head gives an ideal form for combustion, and also ample area for the valves.

The cylinders are lubricated by a positive force-feed oiler, and the main bearings, crank-pin bearings, and wrist-pins are supplied with oil by a gear-driven rotary pump.

The circulating water is supplied by a gear-driven centrifugal pump, and provision is also made for installing a plunger pump.

All of the Diesel-engined boats at present in operation on the Pacific Coast are equipped with Nlseco engines, and the company have under way more installations which will help to bring the Diesel engine before the public, and prove that the engine has come to stay.

During the period of the Exposition the engine will be in operation every day, and the opportunity is thereby afforded all those interested in marine propulsion to study the mechanism. The engine is at present burning Star Fuel Oil of about 24 Grav. Baume, and the exhaust is absolutely clear, showing that perfect combustion is taking place in the cylinders. The engine is developing about 150 H. P., and is using 10 gallons of fuel oil per hour. The fuel costs 2¼c per gallon at the present time, therefore the cost of fuel per hour is 22½c.

During the Exposition period a number of very interesting tests will be run in connection with the rest of the exhibit, and all the data will be kept on hand so that any engineer wishing information will be able to see what has been accomplished.

Freight Report

By PAGE BROTHERS.

Since our last review, March 22nd, only three vessels have been chartered from Portland, namely, steamer "Christian Bors" to U. K. at 70/-, free of commissions, by M. H. Houser, and the sailer "Inveresk," same destination, at 57/6 by Balfour, Guthrie & Co. This vessel had been chartered originally to load from San Francisco by G. W. McNear, Inc., but they obtained the option of loading her up North at 47/6. They then re-chartered her, as above, to Balfour, Guthrie & Co., and the vessel was towed up from here at the expense of the former. Balfour, Guthrie & Co. chartered the "Werribee" with a cargo of wheat to Australia at the rate of 55/- per ton from San Francisco. The sailer "Dunsyre" was taken by G. W. McNear, Inc., to load here for two ports in Sweden at 70/-. The vessel will tow to Panama, and sail from Colon to her destination, and the same charterers also fixed the American steamer "Portland" for Scandivanian ports on a lump sum basis which figures about 85/- to 87/6 per ton. Girvin & Eyre have chartered the sailer "Sully," 47/6 per ton, with oats to Melbourne or Adelaide; Balfour, Guthrie & Co. following suit by chartering "Rene Kerviler" same terms. The owners of these vessels require that charterers shall pay on their wheat capacity.

It is simply scarcity of tonnage that has made the volume of business in freights so small. Lumber freights have shown great strength under a strong inquiry. Balfour, Guthrie & Co. chartered the schooner "Dauntless" from Grays Harbor to Payta for orders at 57/6, and the "William Olson" from Grays Harbor to Talara Bay, reported at 55/-. For Australia, A. F. Thane & Co. have taken schooner "Defiance" from the North to Mel-

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INSURANCE COMPANY
FREIGHTS AND DISBURSEMENTS
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220 BYRNE BUILDING
LOS ANGELES, CALIFORNIA
F. HERRMANN & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK
AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

bourne at 70/-, the "Ludlow," same destination, 72/6, and the "Meteor" reported at 65/- Sydney, 75/- Melbourne or Adelaide. The American Trading Co. chartered schooner "Resolute" from Columbia River to Sydney at 60/-, and the "Edward R. West" from Grays Harbor to Fremantle on private terms. Hind, Rolph & Co. chartered schooner "Mary E. Foster" from Columbia River to Port Pirie at 75/-, and schooner "Gamble" from Puget Sound to Sydney at 62/6.

For the Orient, Mitsui & Co. have chartered steamer "Kurohime Maru" for delivery and redelivery in Japan, about six months, on private terms, and have since rechartered her to the Pacific Export Lumber Company, also on private terms, for delivery in Portland, thence to India, and redelivery Japan. Steamer "Robert Dollar" was chartered from Tacoma to Vladivostok by Geo. S. Bush & Co. of Seattle, for a lump sum. Balfour, Guthrie & Co. loaded schooner "David Evans" for account of the Japanese owners from Columbia River to Japan for a full cargo of lumber. This vessel had been lying in Portland since the war, fearing to venture out until now.

Only one schooner has been chartered for Africa, namely, the "Hawaii" from San Francisco and British Columbia to Cape Town at 100/- per thousand; charterers are Findlay, Durham & Brodie. There is an inquiry for further tonnage, but our coasters do not look with much favor on going so far as Africa, as freights are so good to Australia and the West Coast. They are asking 125/- for Africa.

There is a big demand for steamers or sail tonnage from the North to U. K. Owners, however, are holding at enormous rates, which prevents business. The last charter was steamer "Strathesk" to be loaded by A. F. Thane & Co. She was chartered some time ago, and it is reported her rate is 95/- per thousand. She could easily be turned over to-day at 120/- or more. Parcels of lumber have paid as high as 150/- per thousand to U. K. by the regular lines, and even they are very few and far between. The Australian Government has chartered the "Wotan" to carry a full cargo of alfalfa hay in compressed bales at a rate said to be $15.00 per ton weight. She will be May loading, and the Government is reported to have chartered in Australia a steamer, not yet named, for June loading, and possibly one of the Union Steamship Co.'s steamers for July loading at rates not divulged. Two or three of our steam schooners have been chartered this month at rates ranging from $225.00 to $250.00 per day, delivery and redelivery San Francisco, and to trade in the Pacific Ocean, Gulf of Mexico and Atlantic U. S. A. ports. The market remains firm in every direction, and freights all over the world are very high. The only drop there has been anywhere has been from the Gulf of Mexico with cotton to Europe, because of the blockade by England, of any sort of cargo intended for Germany.

Editor Pacific Marine Review.

Insolent Sir:—As a champion of the eternal rights of the proletariat I am seizing the privilege of voicing my sentiments upon the passage of the emancipation act of the sailors. Having been neither before nor after the mast, I am sure that my opinion will bear some weight. Ever since Esau deserted his birthright for a mess of pottage, desertion has been held in high esteem by those who realize that any form of slavery is abhorrent. Your moral instincts, if you happen to have any, should tell you that wholesale desertion increases discipline and for this reason alone the Seamen's Act is more than justified. As a frequent passenger on steamers this truth has been brought forcibly home to me times without number. According to William Jennings Bryan, "Familiarity breeds contempt," and to have a crew which is familiar with the ship it is sailing on is therefore dangerous. Looking calmly on this question from a passenger's point of view, is it not true that there is always a certain amount of confusion on board a passenger ship in case of accident or danger? You are willing for the sake of argument to admit this much? Very well then. Now if we can confine this confusion to the crew the passengers will remain calm and can be collected. This is an aspect of the case which has not yet been discussed in print and I hope you will give it the space which it so richly deserves. Yours for increased safety. A. GLOBE TROTTER, Esq.

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Poulsen Wireless on the Coast

By AUGUSTUS TAYLOR.

WIRELESS telegraphy, which has done so much to increase the safety of ocean travel, has had a wonderful development during its comparatively brief existence.

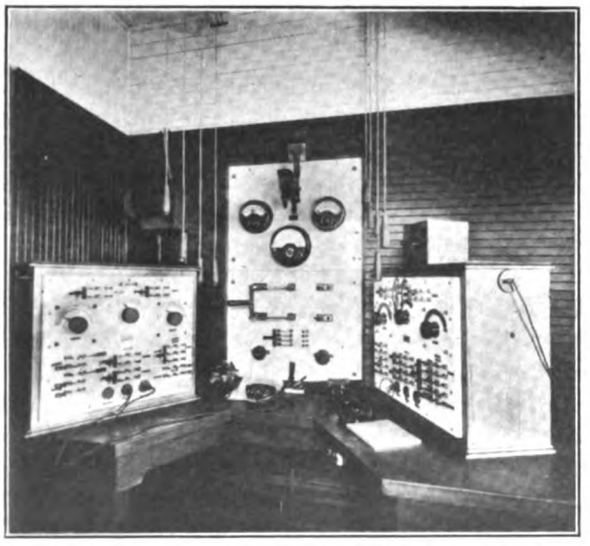
During the last year or two particularly, the art has progressed with wonderful rapidity, and communication on a commercial basis is now established between points so distant as to make it seem probable that the system has practically no limitations.

The greatest advance in wireless telegraphy was made by Valdemar Poulsen, a Danish scientist, who discovered a method of developing undamped or continuous Hertzian waves as distinguished from damped waves that had been previously used by all spark systems. Waves radiated continuously from the sending station, and each wave as strong as its neighbor are known technically as undamped waves, and are thus distinguished from the damped wave system, wherein the currents radiated from the sending station are sent not continuously, but in groups, no two adjacent waves having the same strength.

All original experiments in wireless telegraphy were carried on by means of damped waves, and it was seen that the system had limitations which made its use over long distances impracticable. A new era in the art dawned with Poulsen's discovery of the undamped or continuous oscillations, and the continued wave system has been developed by the Federal Telegraph Company along the Coast to a degree of perfection which has surpassed the most sanguine anticipation of the inventor.

The reasons why radio telegraphists, the world over, have striven to obtain undamped continuous oscillations are:

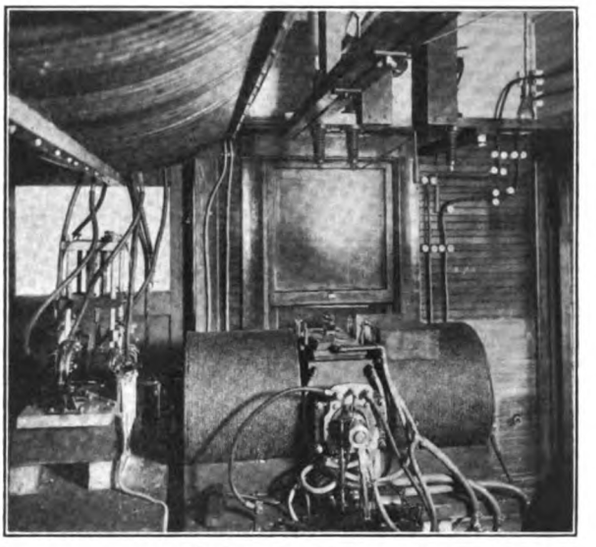
First: Decreased absorption due to daylight. This means that with the undamped wave much less power is required than with the damped wave.



Operating room of Wireless Station at South San Francisco

Second: Much sharper tuning is possible and therefore systems employing such waves are less troubled by interference from other stations, as well as by atmospheric disturbances.

Tuning may be defined as the process or operation of adjusting the apparatus at the receiving station so that the signals from the transmitting station are heard at a maximum of strength with a minimum of interference from atmospheric and other disturbances; the sharper the tuning, the more nearly may ideal results be obtained.



Apparatus room of Wireless Station at South San Francisco

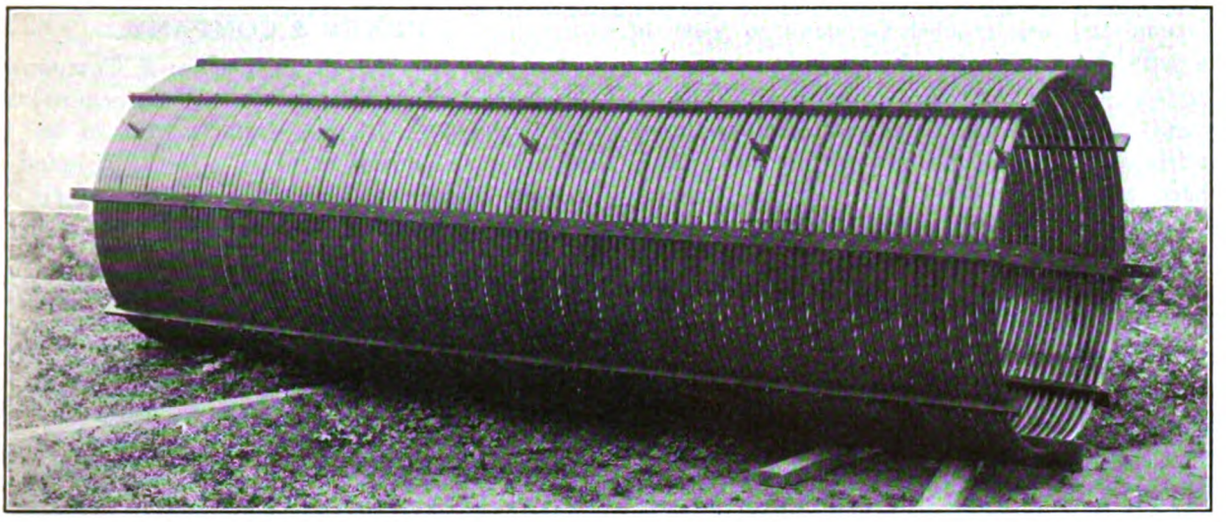
The Poulsen arc system has now been developed to the point where wave lengths varying from 300 meters to 20,000 meters can be used and the receiving apparatus has been refined to such an extent that when "tuned" to receive a message of a certain wave length, it will not receive a signal whose wave length varies 3% from the one to which it is tuned.

For instance, if tuned for a length of 5,000 meters, it would not receive, without adjustment, signals with wave lengths of 4850 and 5150 meters.

It is with no little pride that we record the achievements of the men who brought the Poulsen system to its present state of perfection. Small in numbers, but great in zeal and determination, they struggled on until final and complete success crowned their labors.

It is not easy to take a new device, no matter what its merits, and invade a field already covered with a complete and efficient system, yet the Federal Telegraph Company, the owners of the Poulsen patents, has succeeded in establishing itself on the

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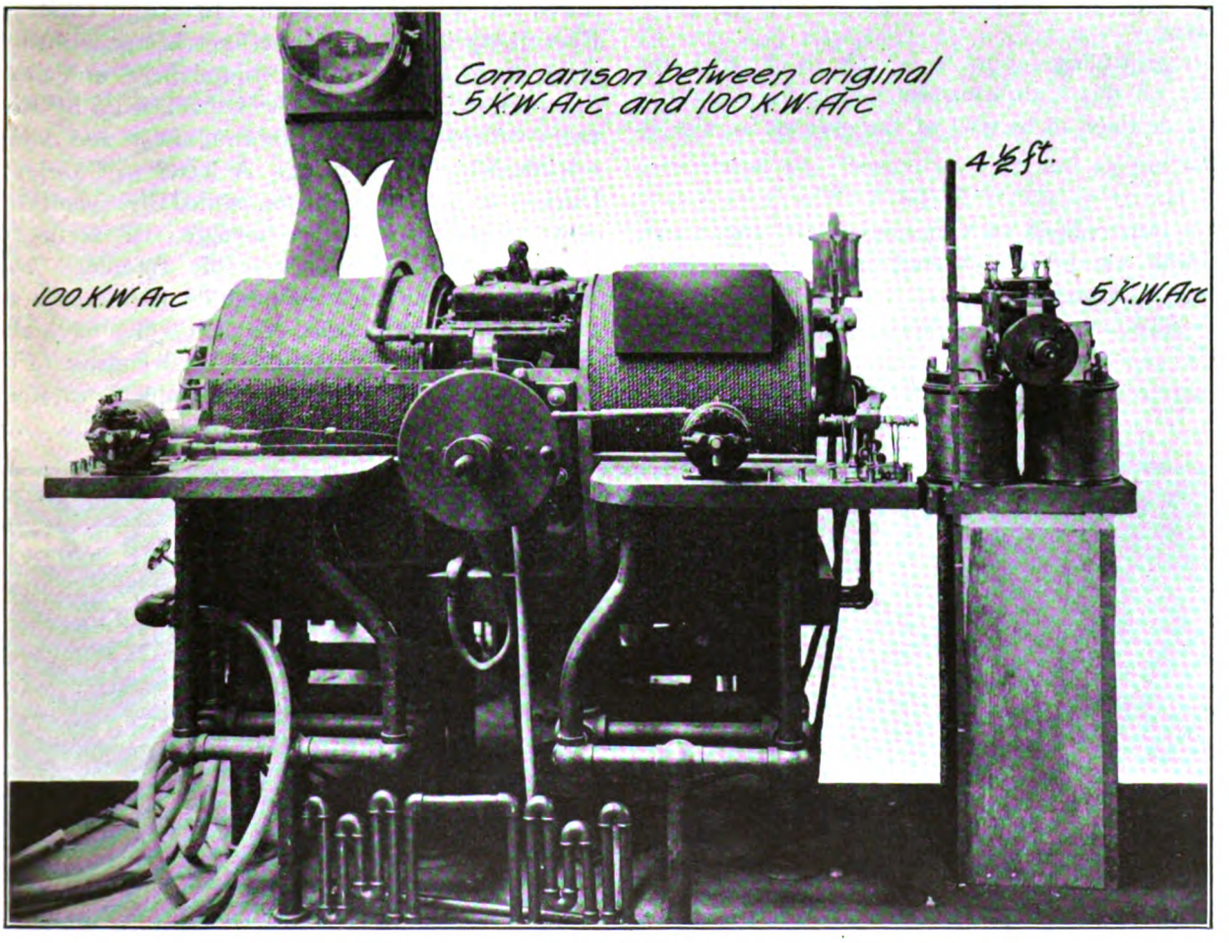


Helix for 100 k. w. Poulsen set

Pacific Coast and Honolulu, and now gives a service by wireless which, for rapidity and accuracy, is certainly, at least, the equal of any of the established wire systems. The history of the Federal Telegraph Company on the Pacific Coast is one of continued achievement and well earned substantial success. Beginning with a few small stations, it now owns a complete system extending from Seattle to San Diego and Phoenix, with trans-Pacific service to Honolulu. The extraordinary results achieved between San Francisco and Honolulu marked a new milestone in the march of wireless progress, and brought the attention of the United States Government to the merits of the new wireless system.

After exhaustive tests, the Government adopted the Poulsen system, which is now in successful operation at Tuckerton, Arlington, San Diego, the Isthmus of Panama, and other places. The Navy is also being equipped with Poulsen apparatus.

When the European war began, the Government took possession of the Tuckerton station and installed a Poulsen set of 60 kilowatts. With this comparatively low powered set, an uninterrupted service has been established between Nauen in Germany and



Poulsen arcs

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Tuckerton, and has enabled Germany to keep in touch with the outside world.

The principal station of the company in California is located in South San Francisco, the installation comprising one 608-foot and one 440-foot mast, and is equipped with a 100 kilowatt arc. Service between San Francisco and the southern stations is maintained by a station on the ocean beach, about a mile south of the Cliff House. This station is also used to communicate with ships at sea.

It is in this service that wireless has played its most important part, and has given an added feeling of security to ocean travelers, and also been the means of saving thousands of lives.

The local steamship companies quickly recognized the superiority of the Poulsen system, and the factory of the Federal Telegraph Company located at Palo Alto has been worked to its full capacity to supply them and the Government. A large number of vessels are already equipped with the Poulsen system. Among them may be mentioned the "Yale" and "Harvard" of the Pacific Navigation Company; "Sierra," "Sonoma" and "Ventura" of the Oceanic Steamship Company, and the Union Oil Company fleet, the steamers of the Oceanic Line being able to keep in constant communication with the land during the voyage to Honolulu.

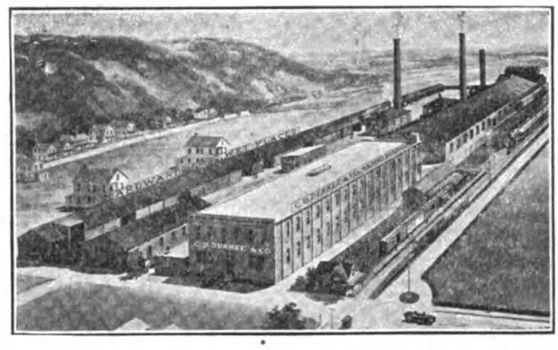
Commercial telegraph service by wireless is to-day a fixed institution, and the rapid progress made in this art has not been surpassed in any field of human endeavor.

It is gratifying for us to be able to chronicle the success of this California enterprise, an enterprise that is destined to become of the greatest service to mankind.

The Department of Commerce has announced that radio equipment is being installed on five additional lighthouse tenders, two of these vessels being stationed on the Atlantic coast, two on the Pacific coast and one in Alaska. The range of the wireless equipment will be from 100 to 300 miles.

DURKEE & COMPANY.

The new home of C. D. Durkee & Company at Grasmere, Staten Island, New York, is now completed and the firm has settled down in its new quarters. About three years ago the demand for Durkee "Hardware for wet places" had so far outstripped the firm's factory equipment that greatly

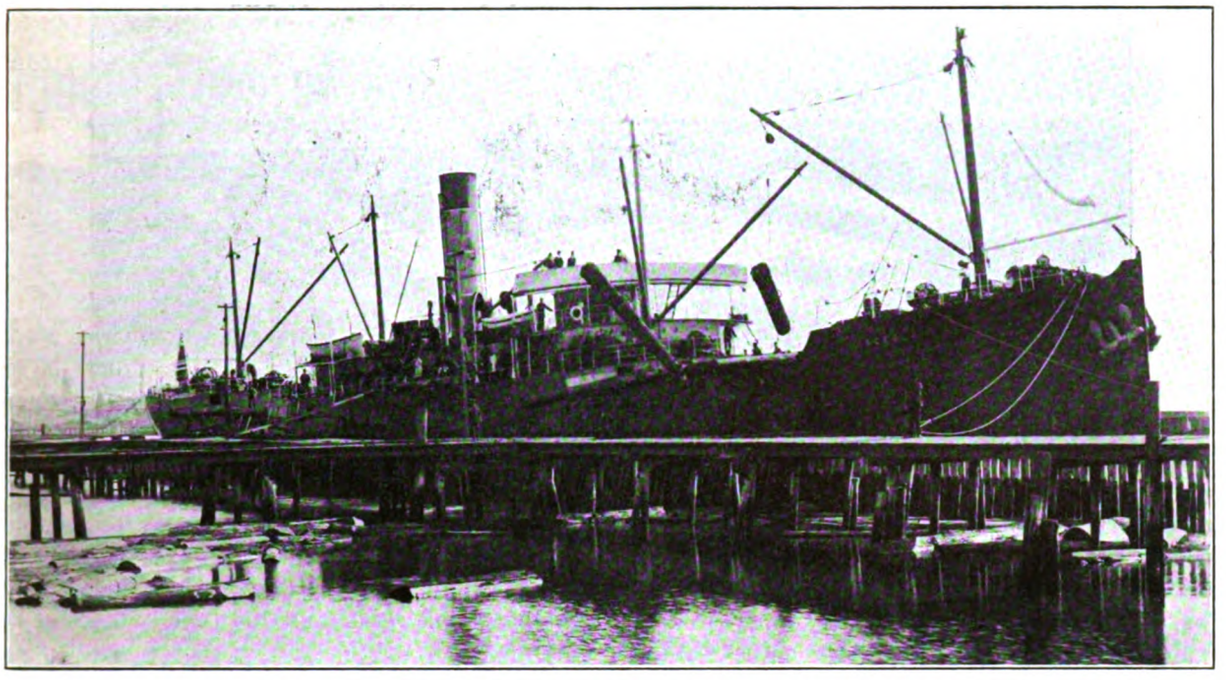


The new Durkee factory at Grasmere, Staten Island, N. Y.

enlarged production facilities became imperative. The result has been the large model factory at Grasmere. A splendidly equipped pattern shop, which serves also as an experimental station for new devices, is situated in close connection with the brass and iron foundries, and from there the castings go direct to the machine shop and assembling floors. The extent, variety and usefulness of the Durkee products can best be appreciated by a study of their 1100 page catalogue. Everything in the hardware line that goes into the make-up of a boat will be found here, and everything listed in the catalogue is backed up by many years of reputation for thoroughness and honest workmanship and dealing. A letter to Charles D. Durkee & Company, accompanied by twenty-five cents in stamps to cover postage, will secure the reader a copy of this valuable reference book, which contains handy tide tables, motor boat and yacht racing rules, laws governing the navigation of various canals, weights and strengths of various metals, etc., besides a complete catalogue of everything in the marine hardware line.



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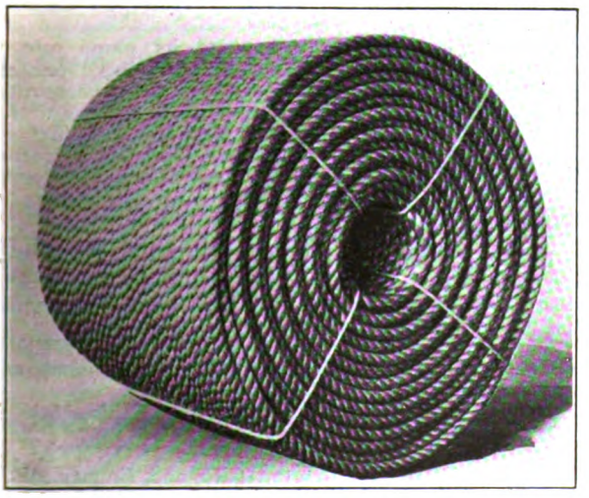


Yanking heavy mahogany logs out of a steamer's hold with Columbian rope

Columbian Rope

For many years Manila fibre has been regarded as the premier rope and twine making material, as tests for strength, durability, resistance to deterioration, pliability and lightness all tend to strengthen its claim to superiority. Manila hemp or abaca is a plant belonging to the plantain or banana family, the commercial fibre being derived from the stalk or trunk of the wild plantain of the Philippine Islands. The strongest and best of our hard cordage fibre, it is employed in the United States for standard binder twine and all sizes of rope. The fibre is creamy white to reddish white, lustrous, easily separated, stiff and resistant, while its lightness has always been a strong factor in its adaptability for the running and standing rigging of ships. Structurally the bundles of fibre are very large, but easily separated into fibres of uniform diameter. The walls of the cells are of equal thickness, growing slender towards the ends uniformly and regularly. In the Islands, the finer grades of fibre are widely used for fabric manufacture.

Attempts to grow the abaca commercially in Florida and elsewhere have met with indifferent success and to the Philippines the makers of the highest class cordage still look for the most reliable source of supply. The fibre was first imported into Salem and Boston in 1824 and as the United States at that time was a seafaring nation these ports became the early centers of the rope making industry. In old Boston reports we find that

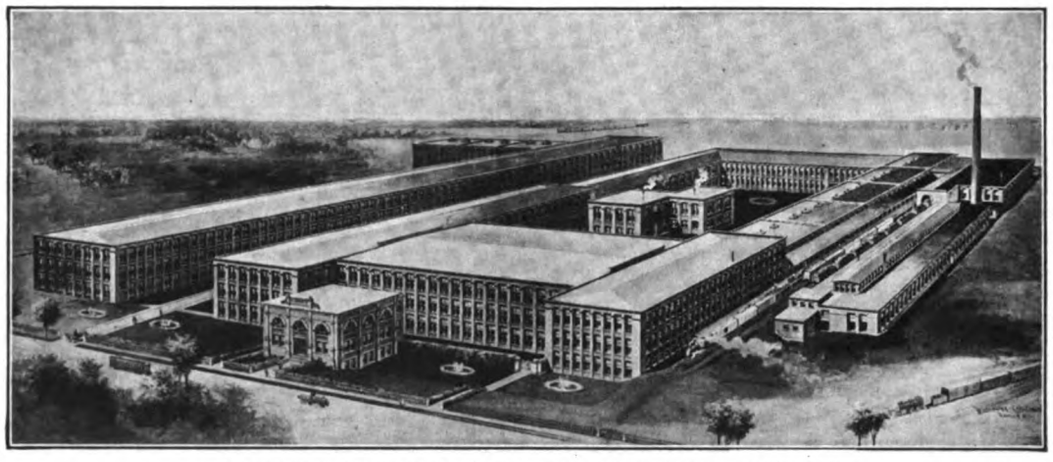


A coil of one-inch Manila rope



The bales of fibre are taken to a warehouse to await a favorable market

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The Columbian Rope Company's factory at Auburn, New York

"The making of ropes in rope walks is now become our principal industry and that upwards of fifty workmen are engaged in this great industry."

The extraction of the fibre is a simple process. The abaca is cut near the roots when the plant is from two to four years old and just before blossoming; if cut earlier the fibre is finer but shorter and the length of the fibre is an important matter in the strength and uniformity of rope. After stripping off the leaves, the stem is slit from end to end and the sheathing layers of cellular matter are separated, dried for a day or two and then cut into narrow strips. These are scraped until the fibre is free of all extraneous matter. The bundles of wet fibre are then shaken into filaments, washed, dried and sorted. This is the export fibre for cordage purposes, the fabric fibre being further treated with heat and beating to soften it and break up the filaments. The export article is made up into bales of about 270 pounds weight.

Among the makers of high class rope, none has a securer hold on the good will of the marine fraternity than the Columbian Rope Company of Auburn, New York. The secret of this firm's success has been careful manufacture and testing coupled with a most rigid and severe selection of the raw material, the Manila hemp.

ELLICOTT DREDGES MAKE GOOD.

Probably there is no public work going on in the State which is of benefit to such a variety of interests as is the work being done on the straightcning and deepening of the channels of the Sacramento and San Joaquin Rivers. This work being co-operated in by the property owners of the delta lands, the State, and the United States Government, under the direct supervision of the United States Engineers, is progressing with a continuity that is sure to be fruitful of great results in transportation, navigation, and freedom from floods.

To the layman it is hard to see just what work is being done, as most of it goes on under water, but a visit to the dredges, the "San Joaquin" and "Sacramento," which are the latest word in modern river and harbor dredges, from the shops of the Ellicott Machine Corporation, of Baltimore, specialists in the building of dredges, barges, schooners and vessels of this type, will soon demonstrate even to the layman that there is "something doing" in removing the bottom of the river and putting it up on the banks. The crews of these dredges take a great interest in their work and have proven themselves exceedingly efficient, the latest record for a two months' run of one of these 20" dredges being 970,692 yards, or an average of nearly 1000 yards per hour. The material handled consists of about 60 per cent. sand, and 40 per cent. clay and mud, and while it is perhaps not as hard digging as some other work, this yardage will be considered by any dredge master as a phenomenal run. If Uncle Sam permits this good work to go on as it is doing, the day is not far distant when we will have much more traffic going up and down these two great rivers.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF AUGUST 24, 1912,

of Pacific Marine Review published monthly at San Francisco, Calif., for April 1st, 1915.

Editor, F. M. Dickie, 24 California St., San Francisco; Managing Editor, F. M. Dickie, 24 California St., San Francisco; Business Manager, J. S. Hines, 24 California St., San Francisco; Publisher, J. S. Hines, 24 California St., San Francisco.

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J. S. HINES.

(Signature of editor, publisher, business manager, or owner.)

Sworn to and subscribed before me this 15th day of April, 1915.

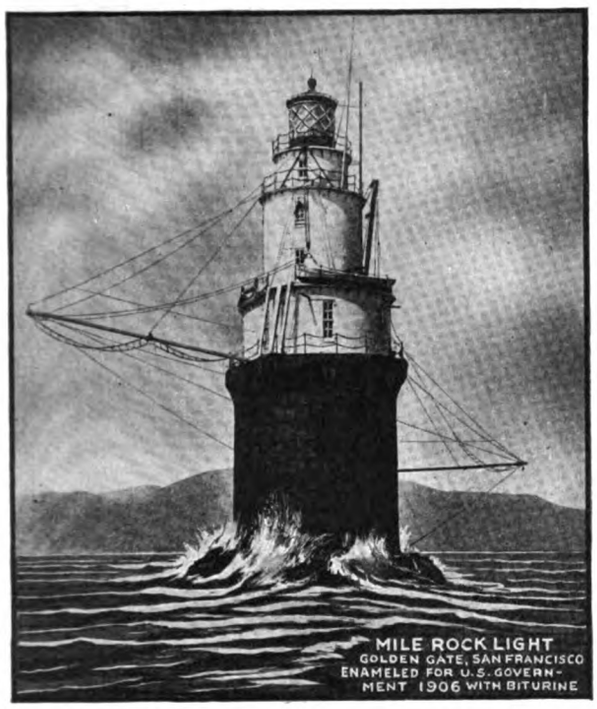
(Seal) LINCOLN SONNTAG,

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(My commission expires Dec. 20, 1917.)

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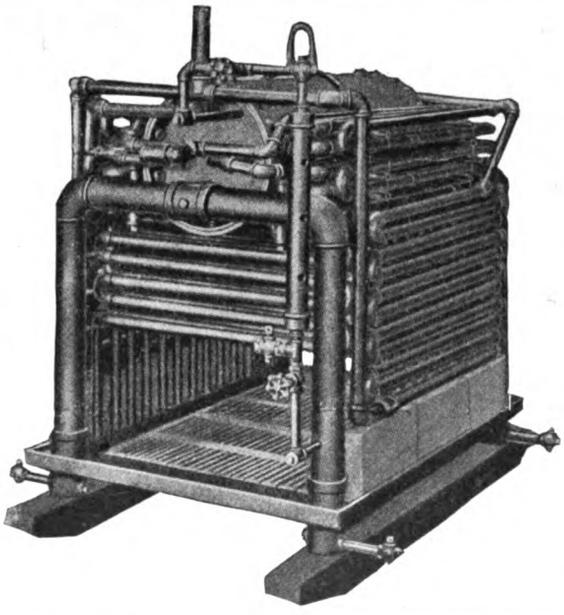
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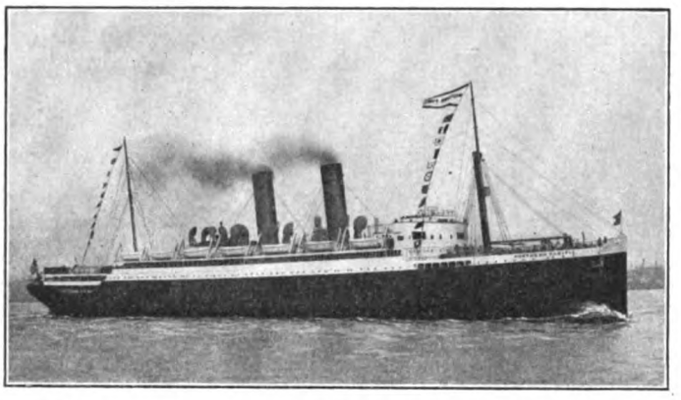
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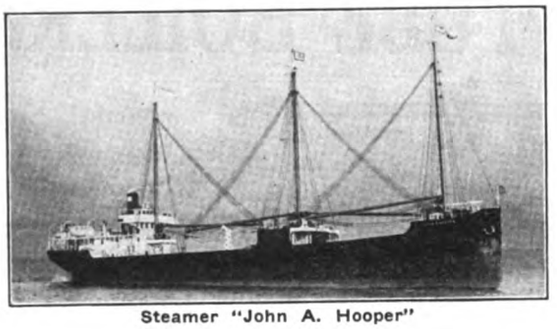
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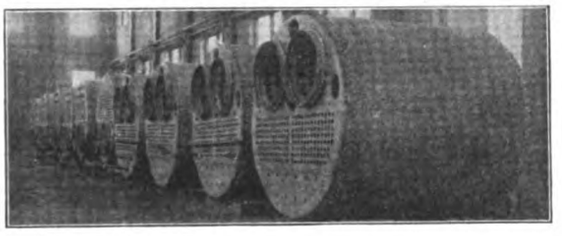
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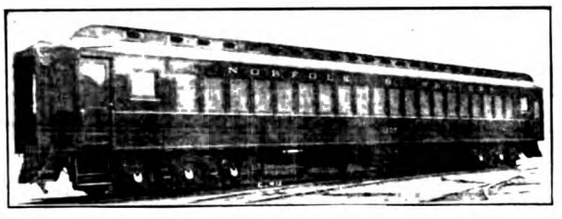
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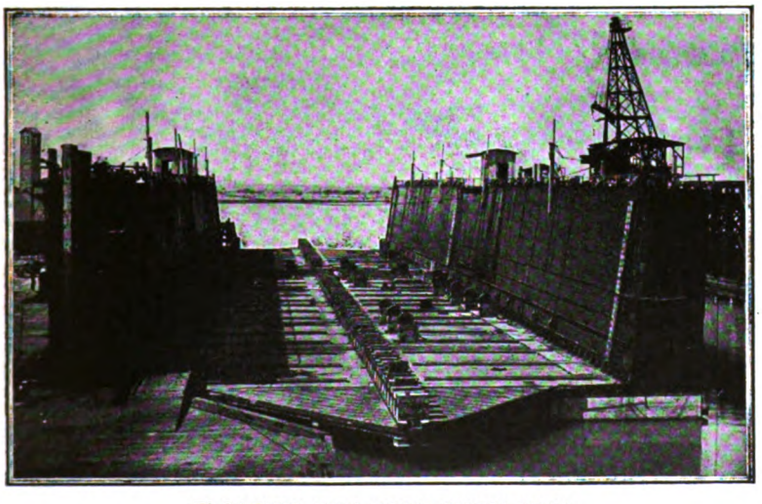
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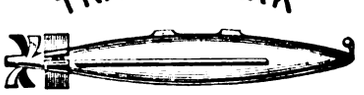
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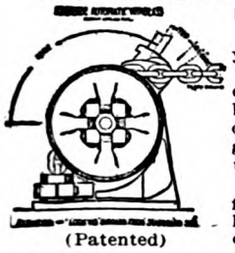
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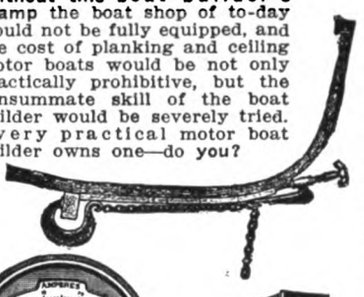
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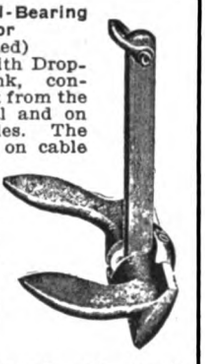
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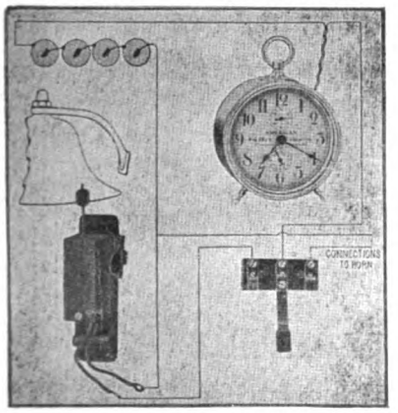
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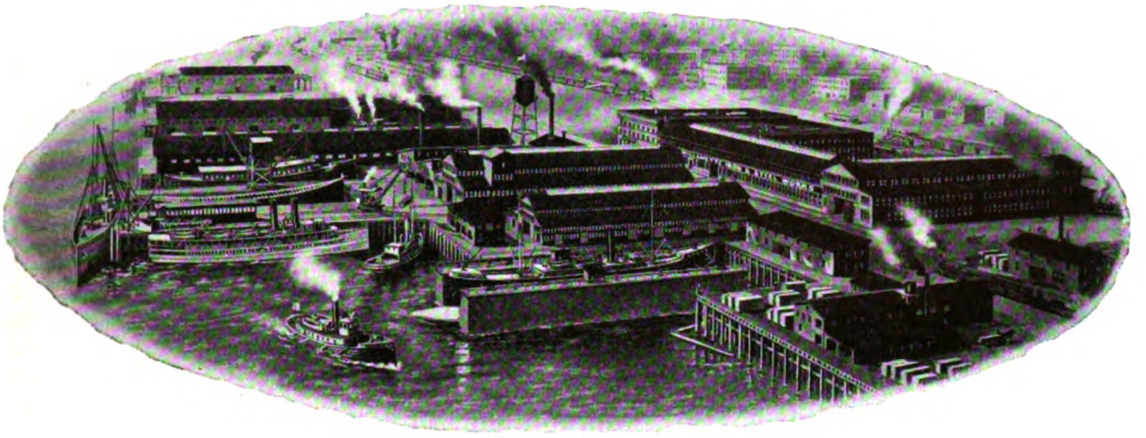
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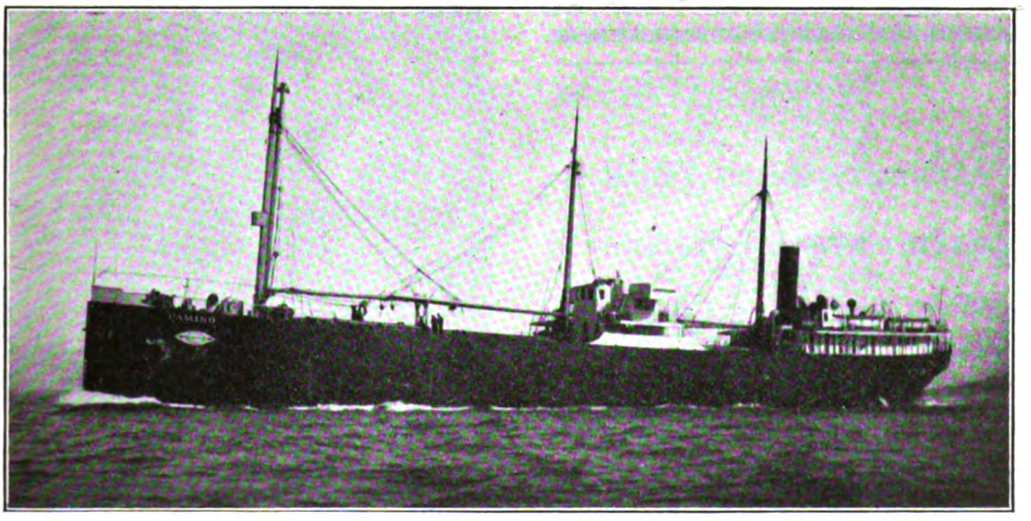
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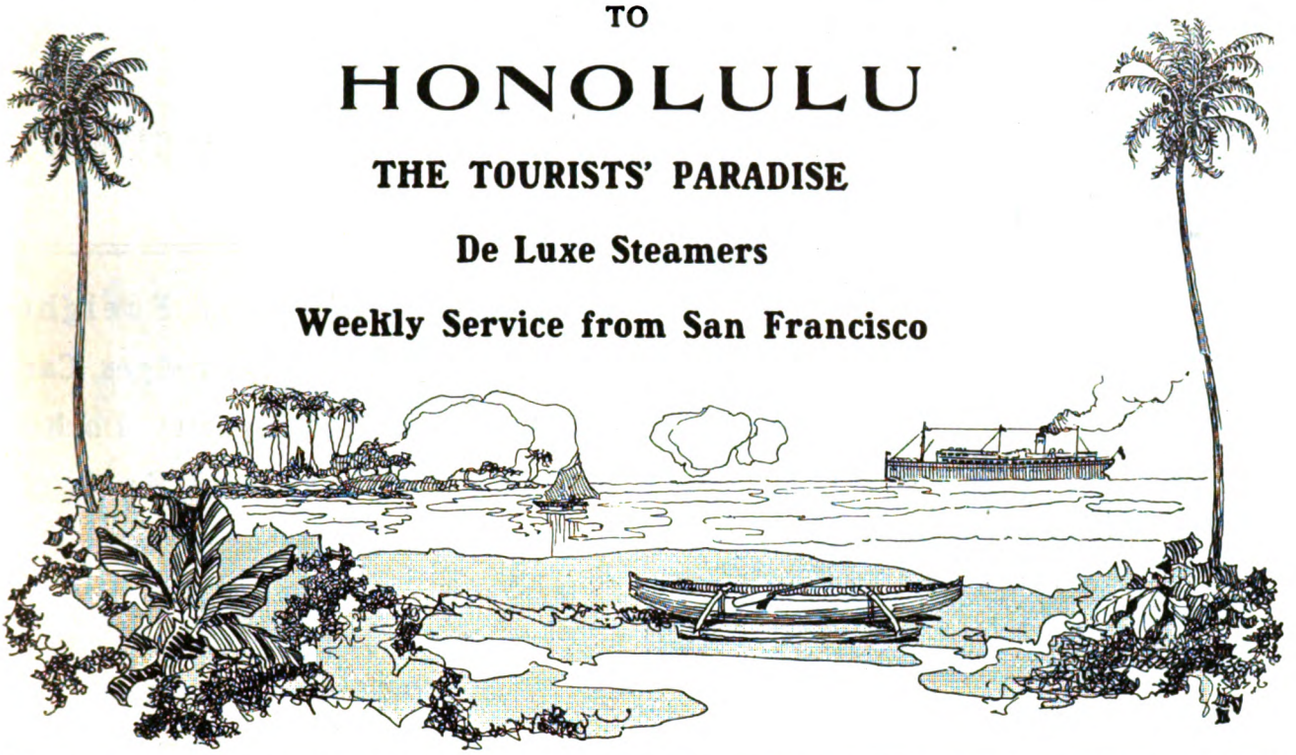
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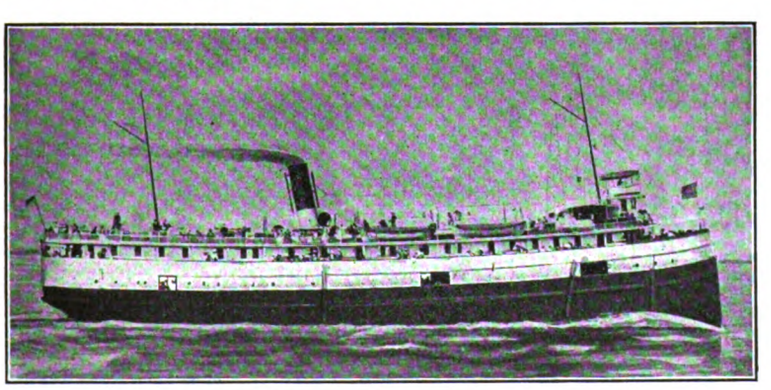


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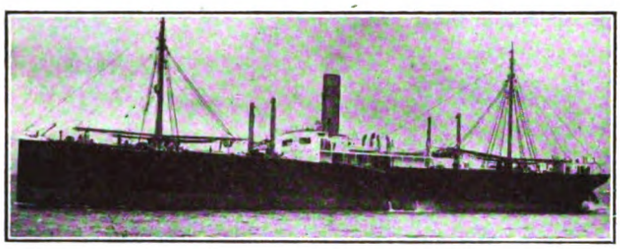
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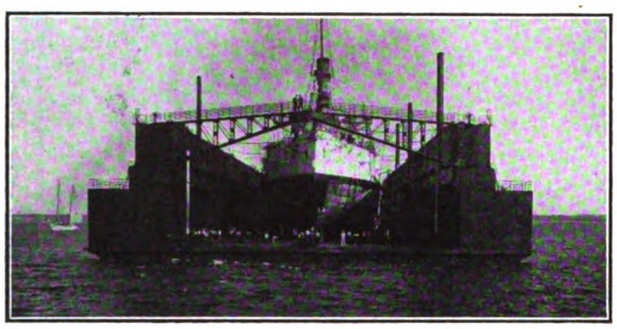
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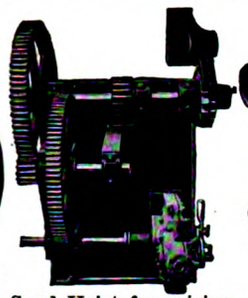
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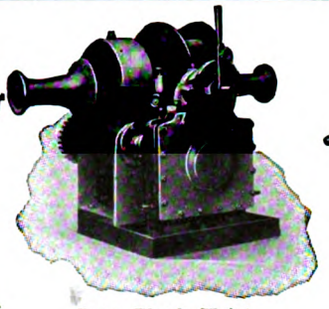
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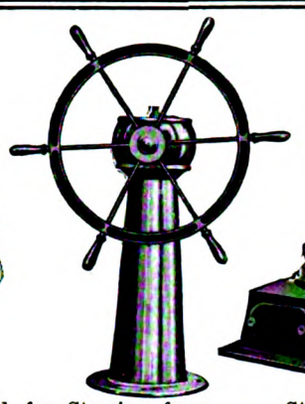
Single Wheel Steam Steering Gear



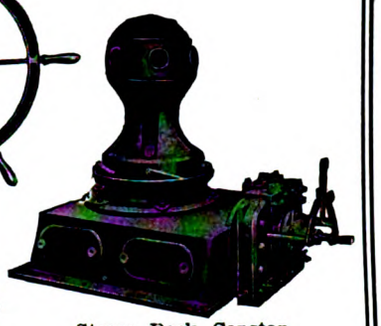
Spud Hoist for raising and lowering spuds on dredges



Gang Plank Hoist

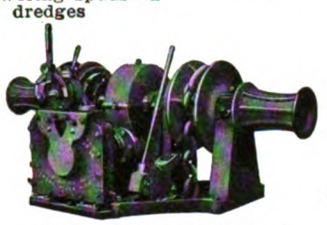


Standard for Steering from top of Pilot House

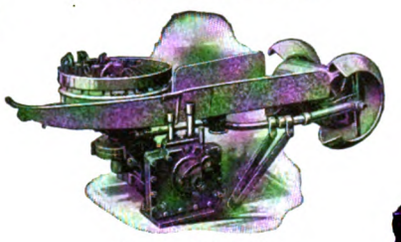


Steam Deck Capstan

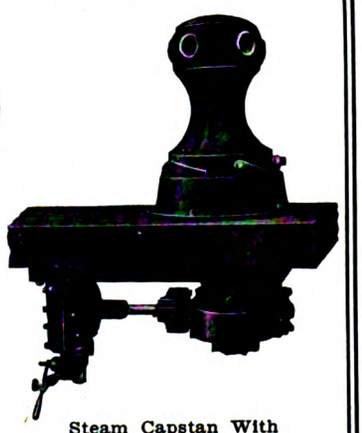




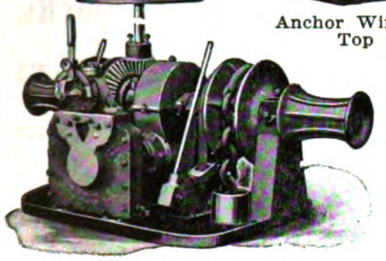
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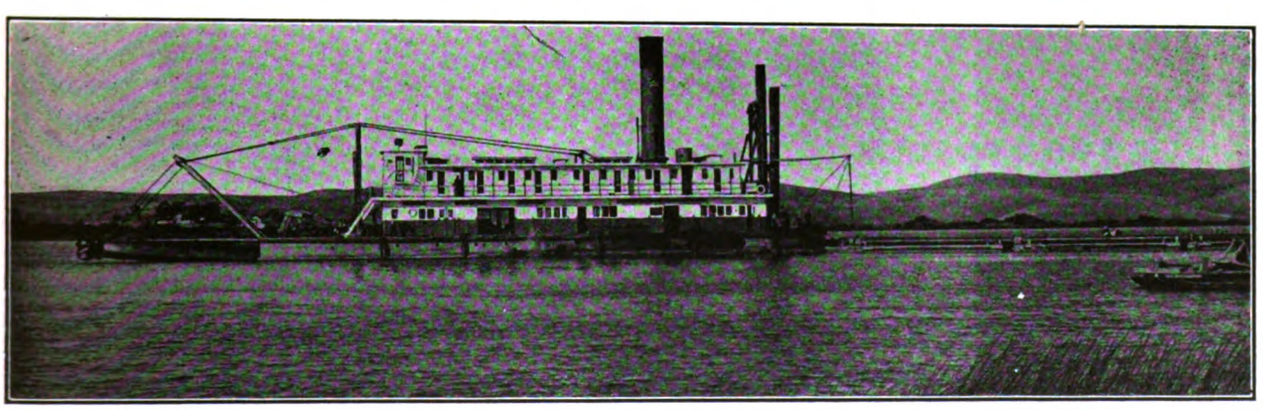
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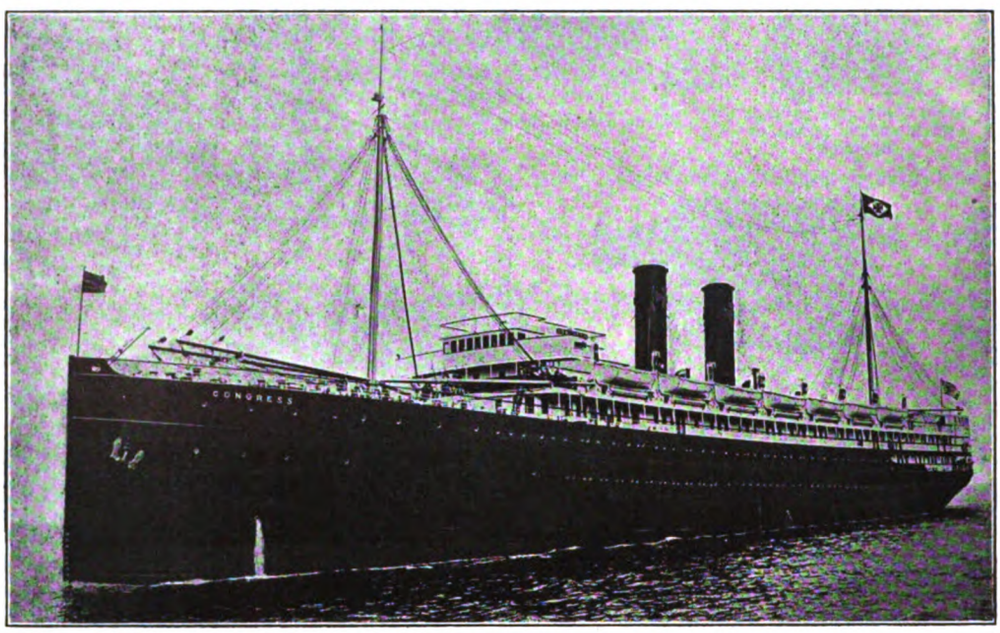
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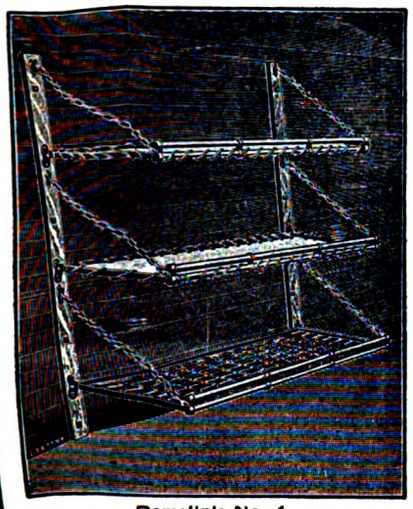
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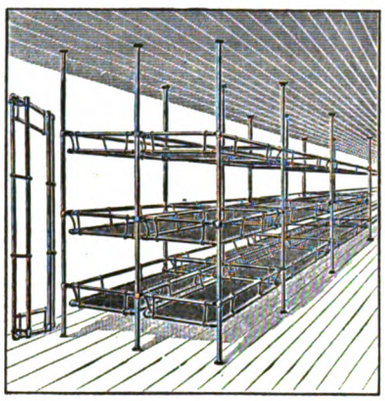
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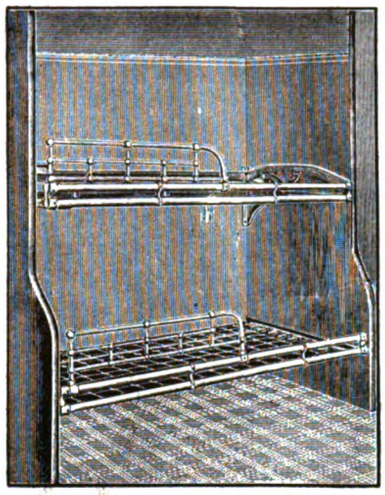
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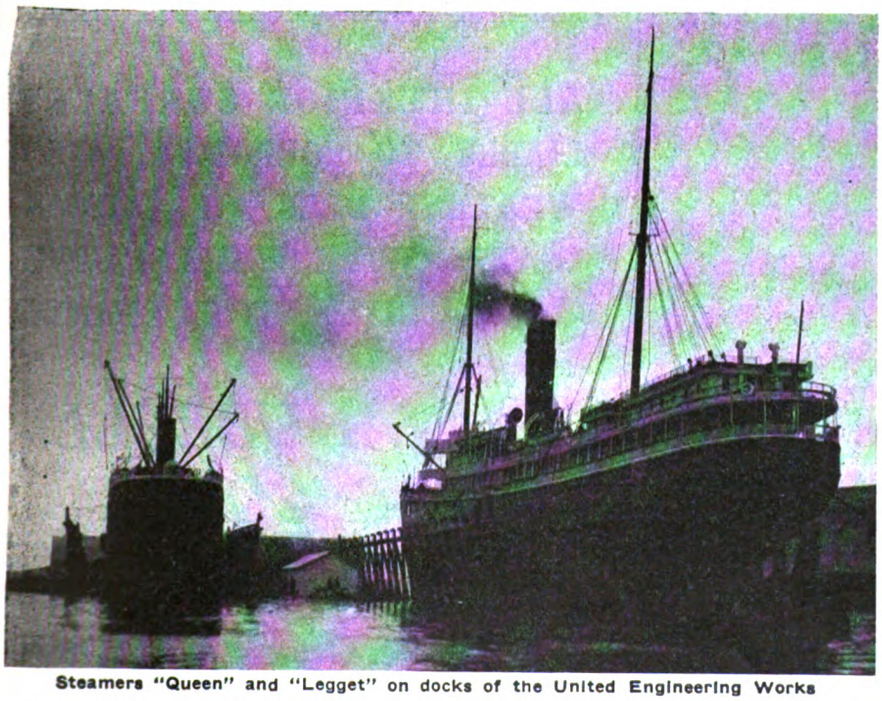
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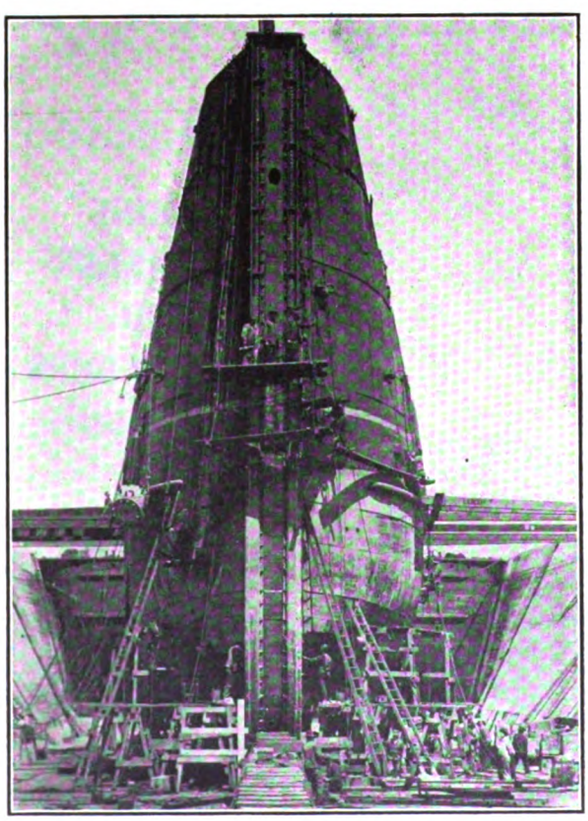
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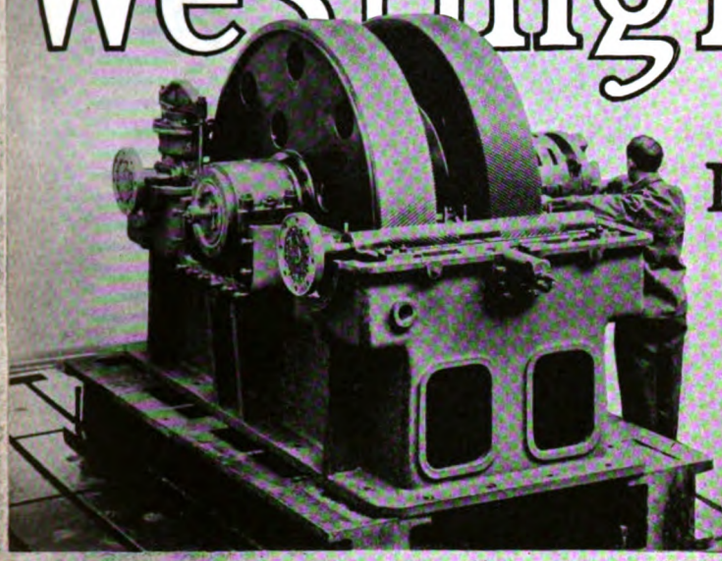
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Turbines and Reduction Gears

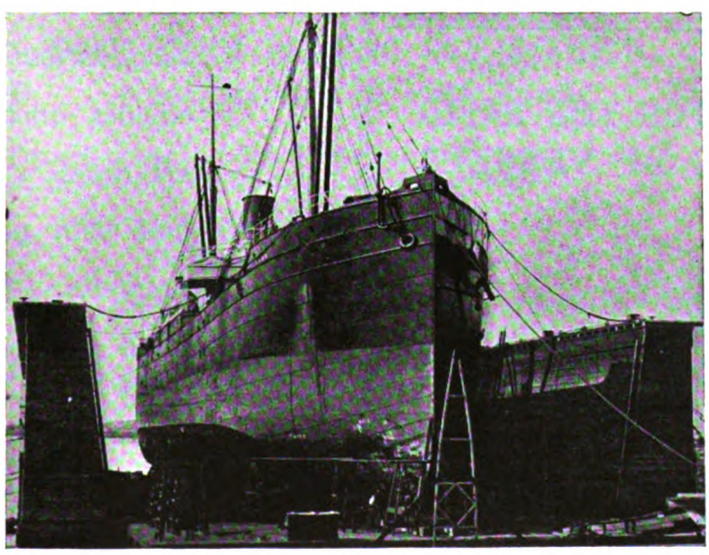
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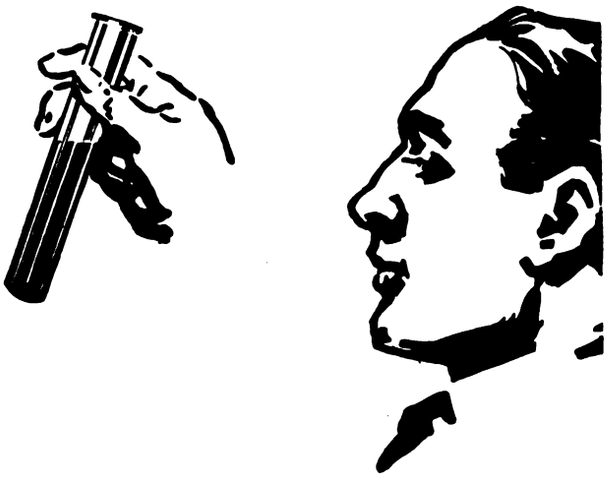
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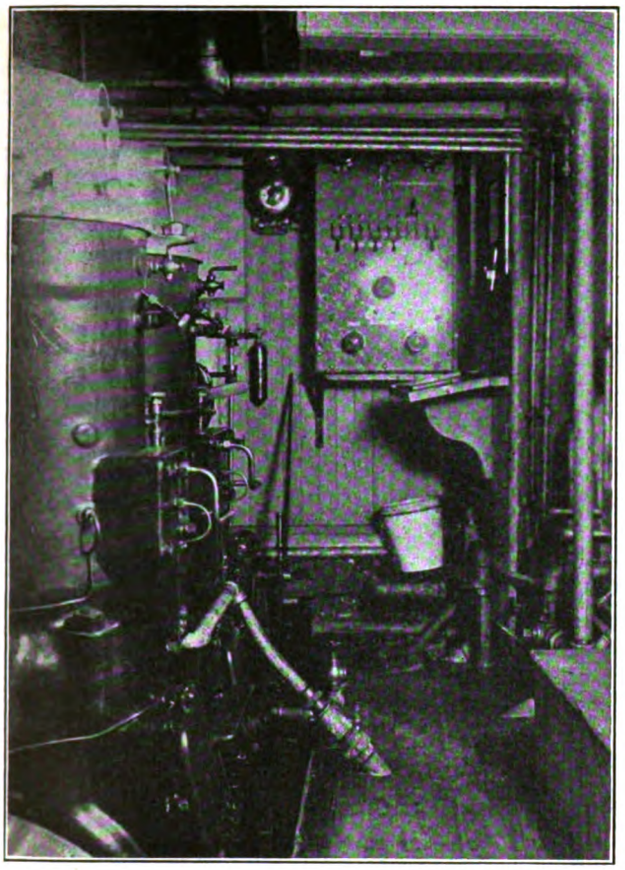
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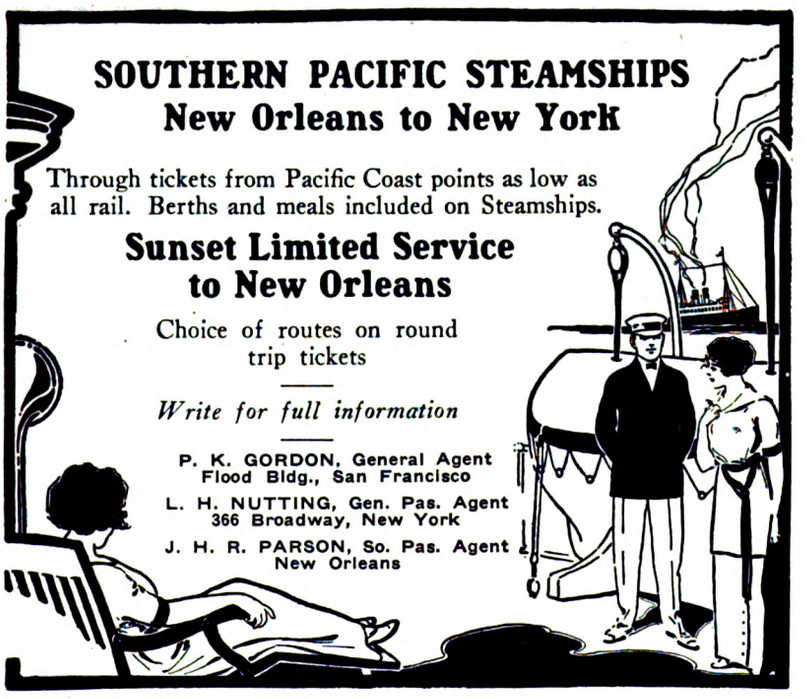
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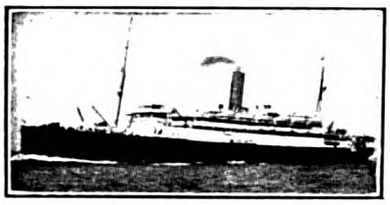
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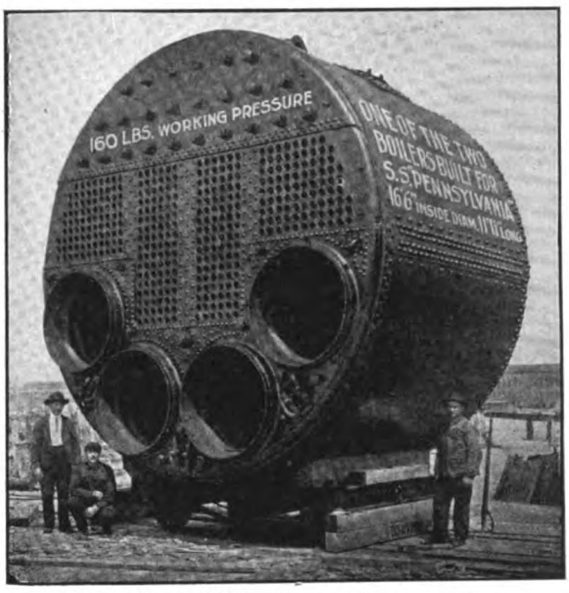
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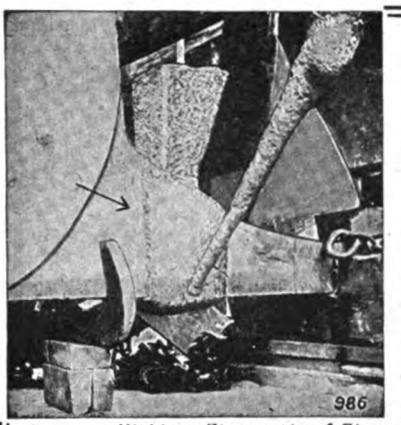
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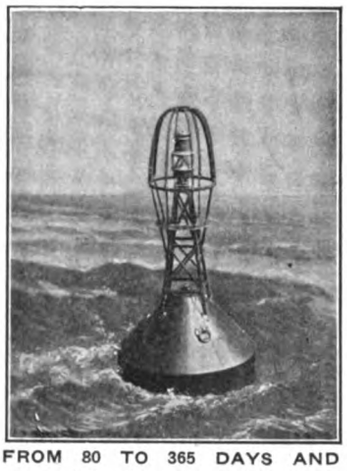
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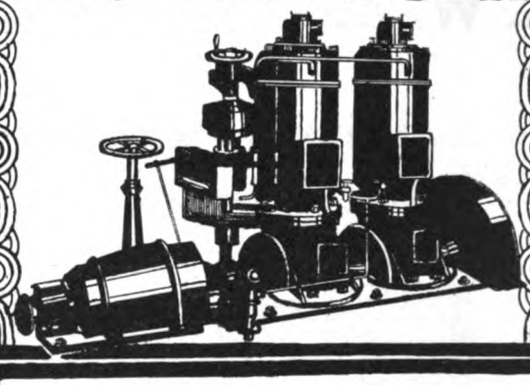
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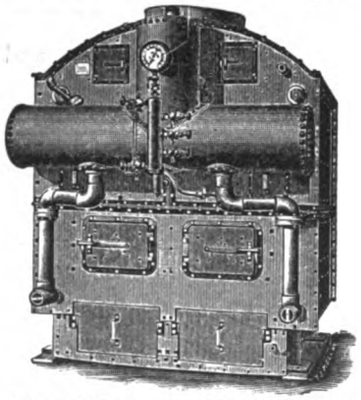
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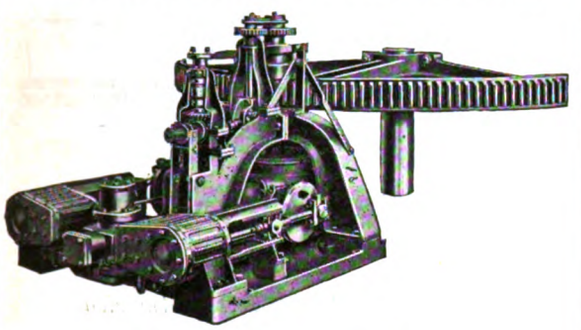
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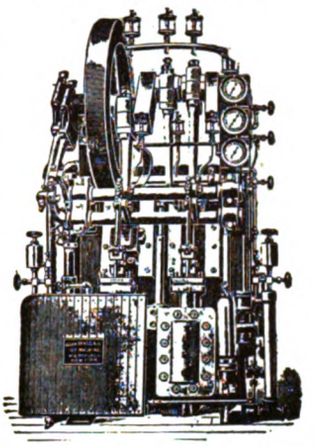
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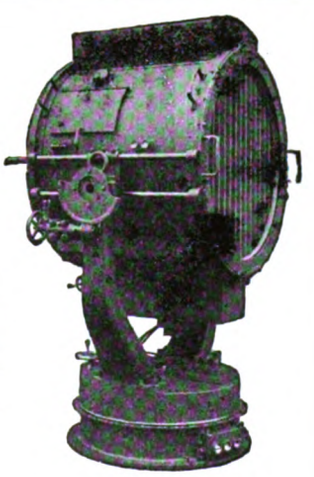
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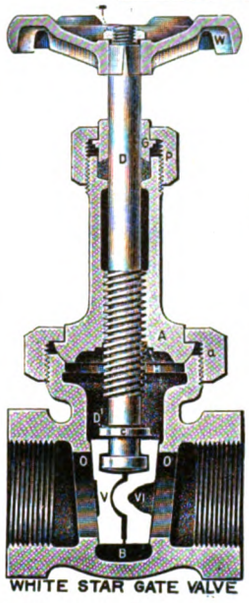
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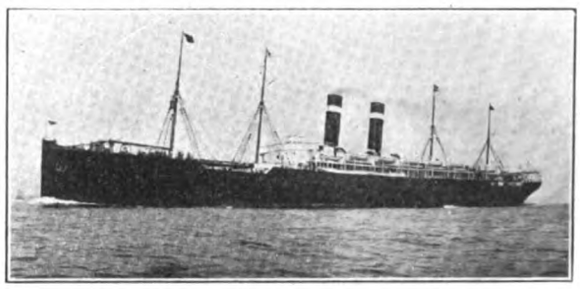
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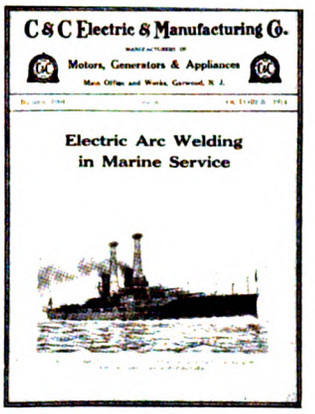
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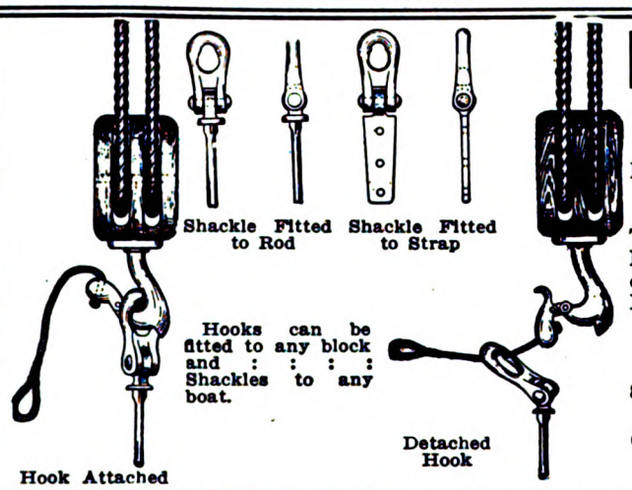
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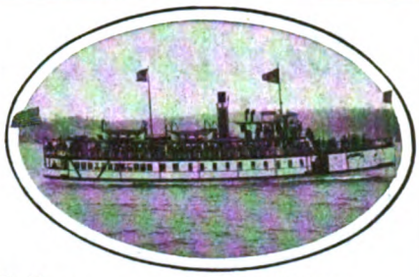
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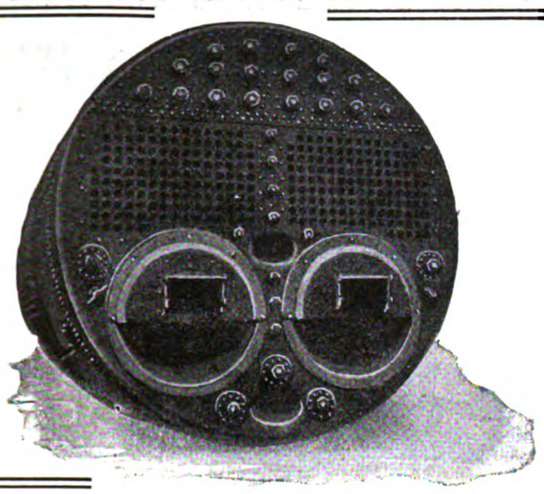
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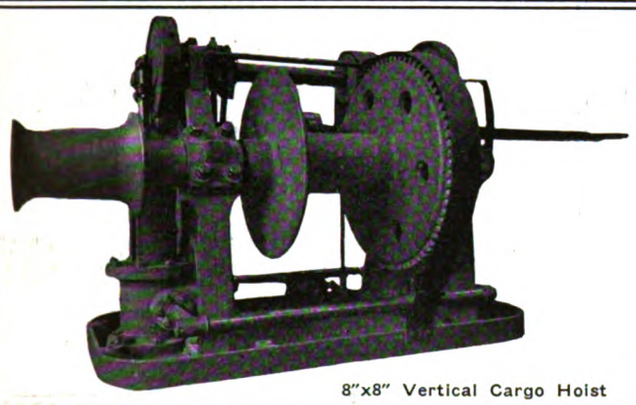


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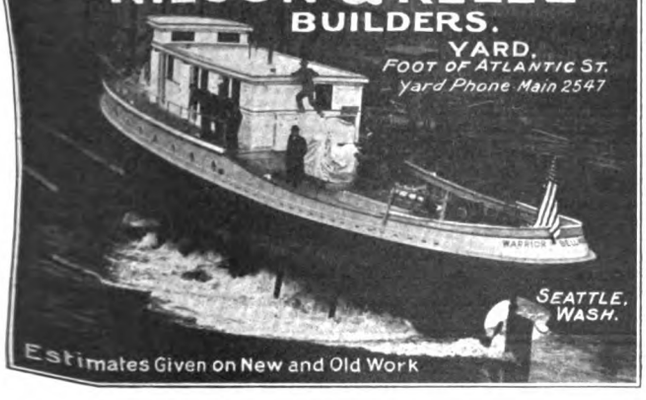
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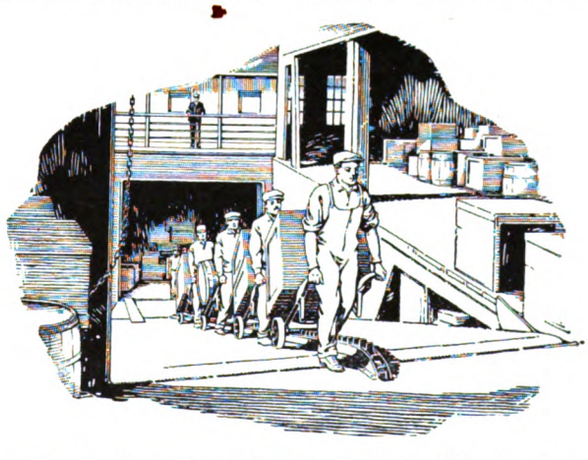
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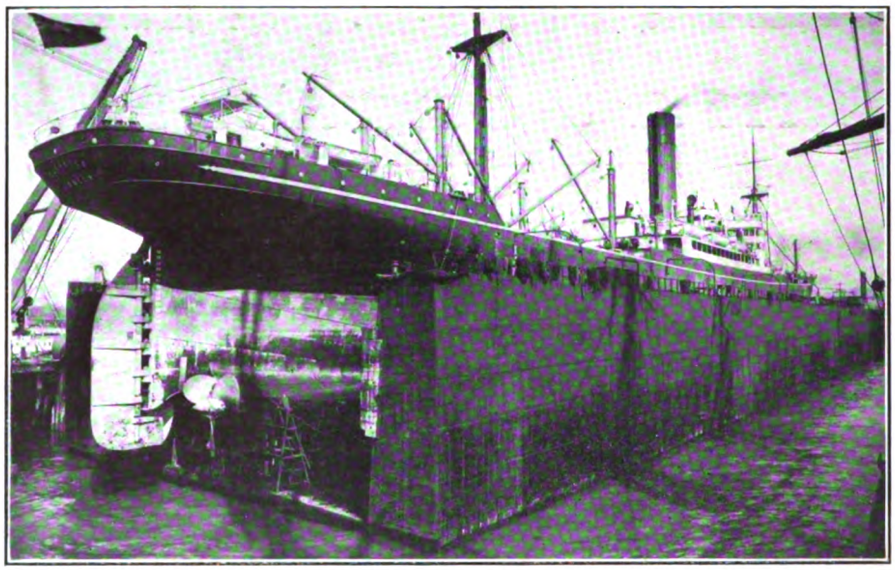
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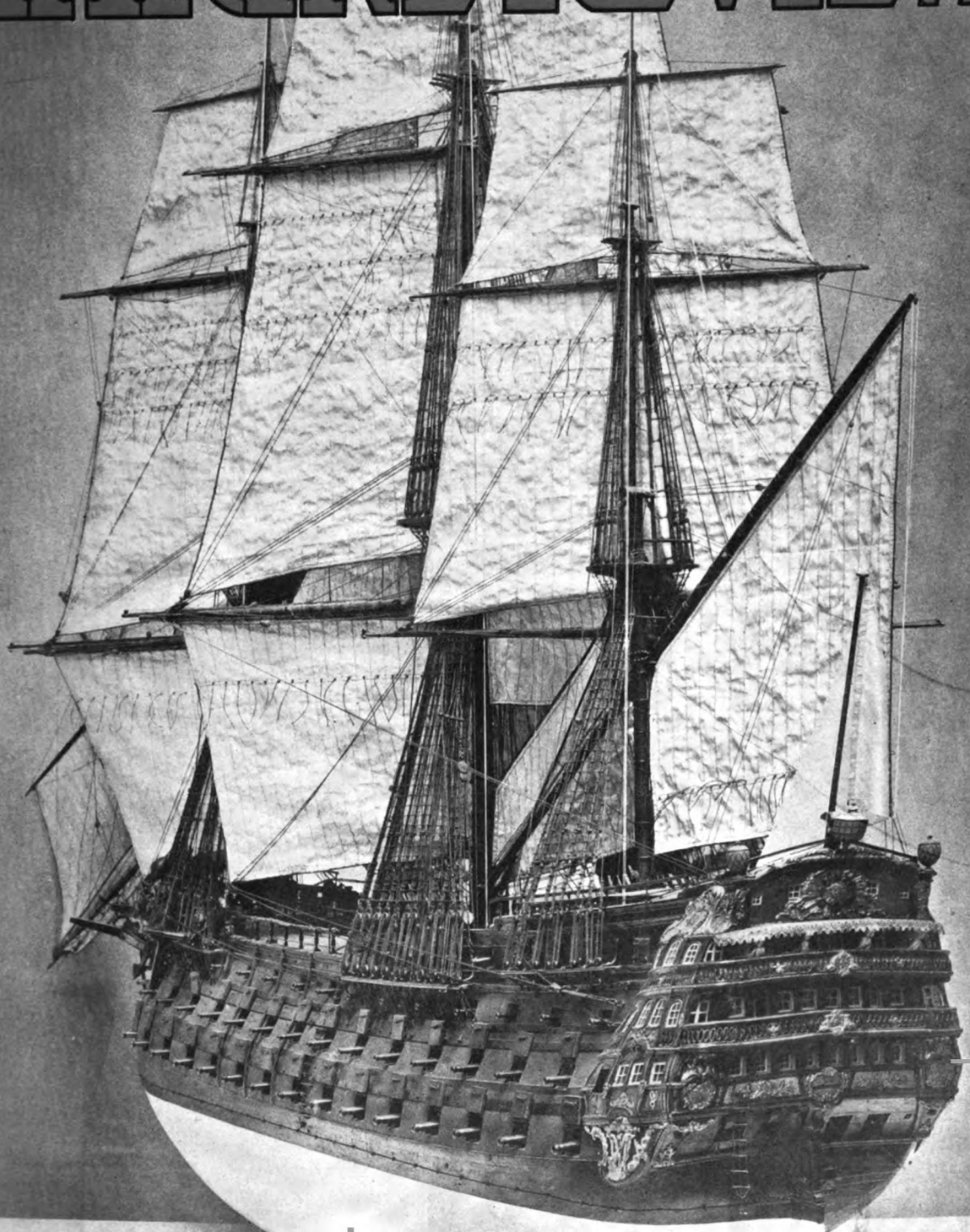
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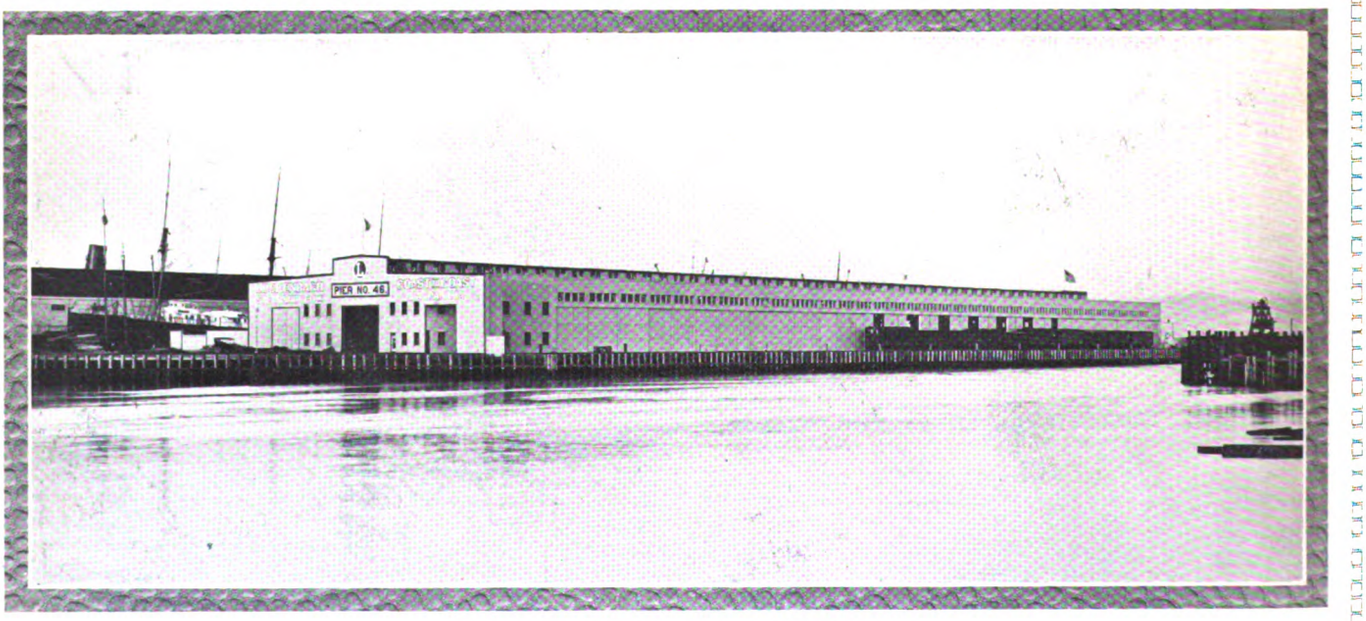
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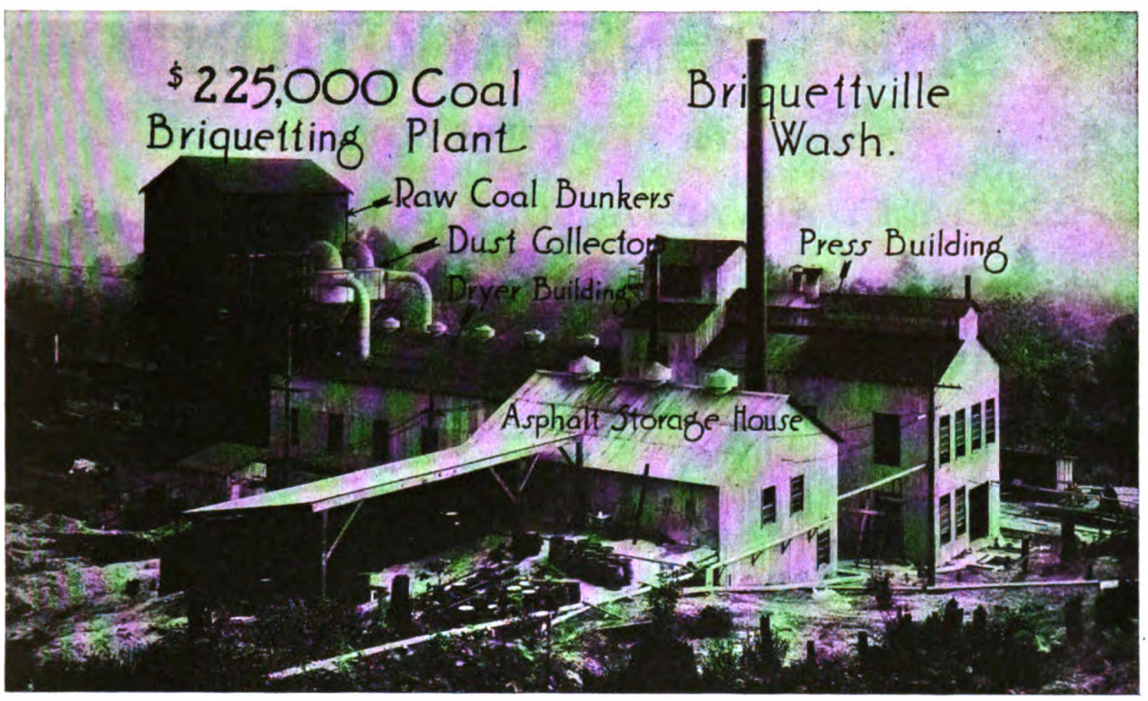
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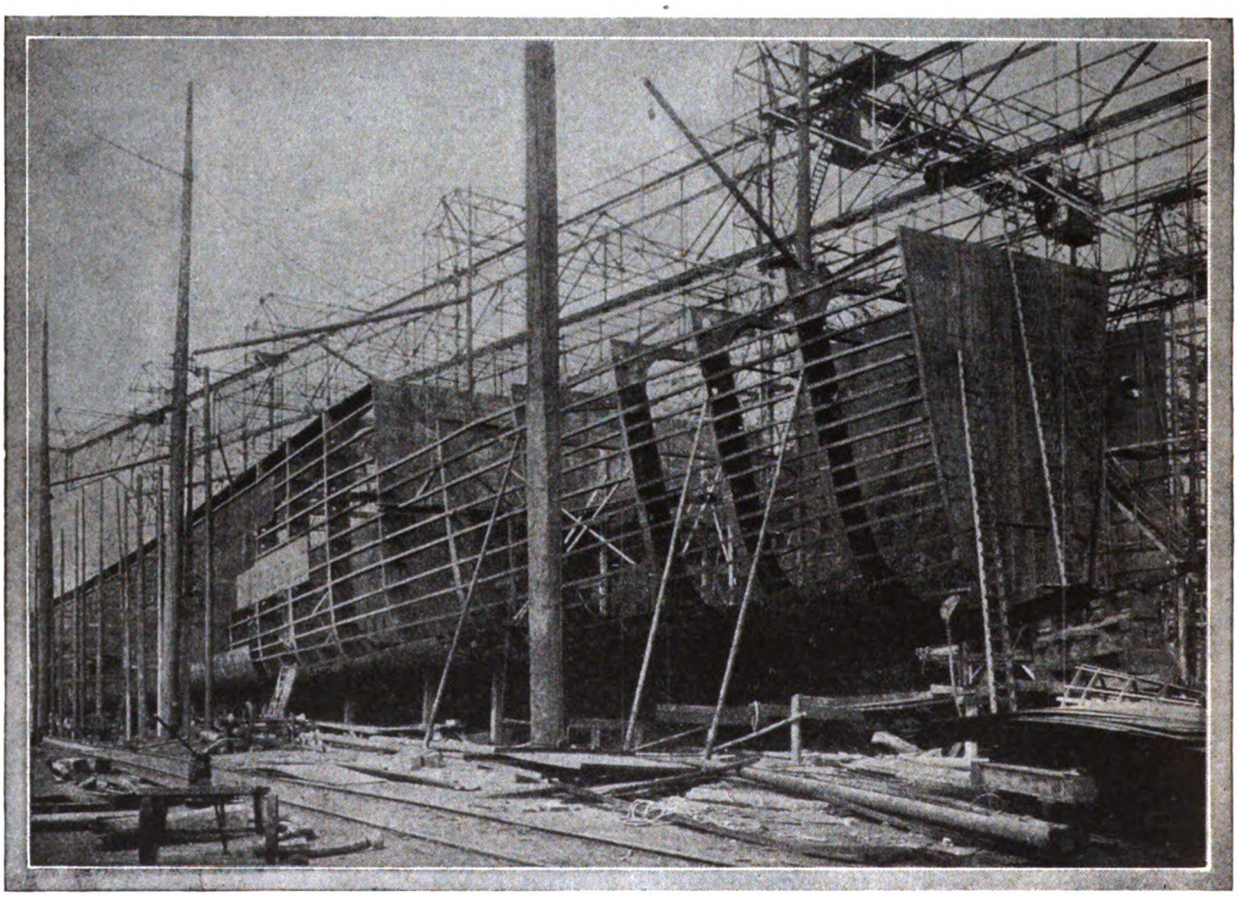
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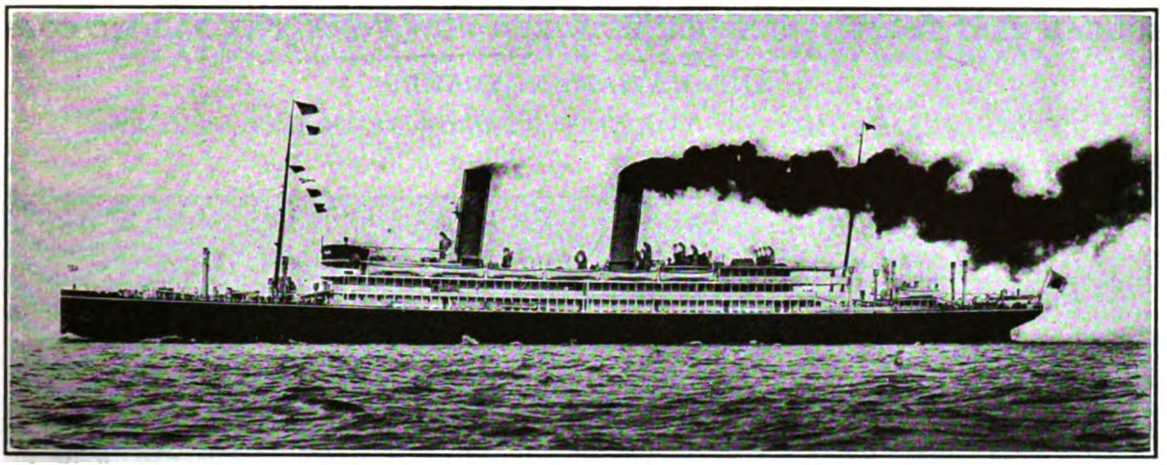
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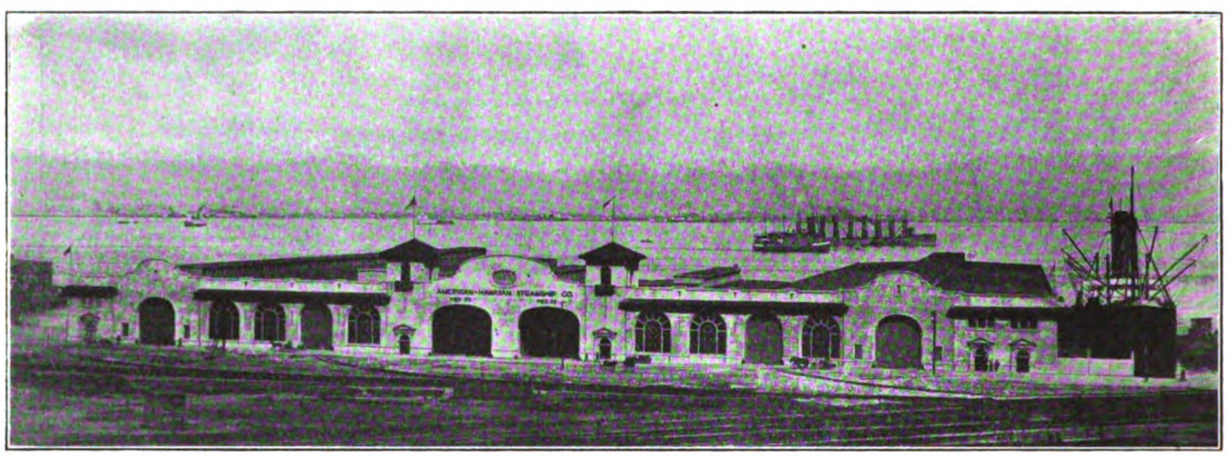
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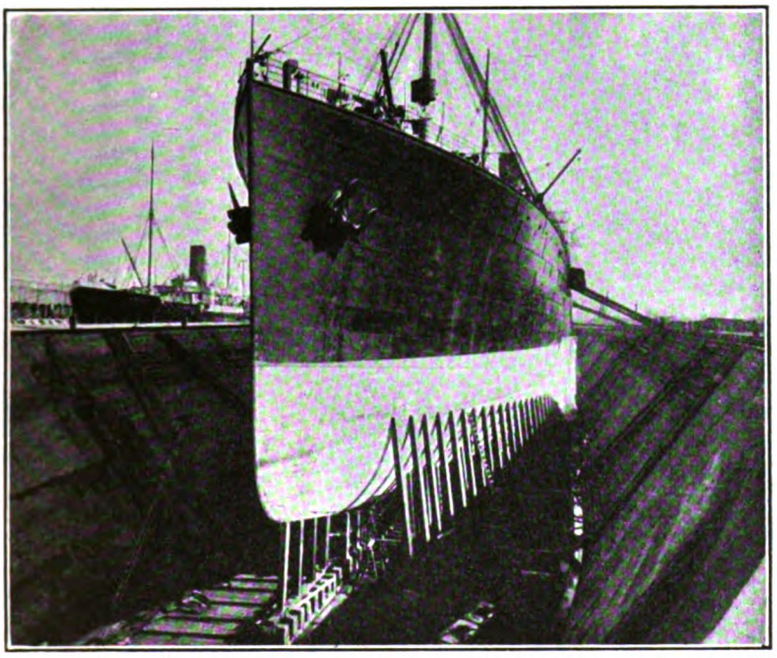
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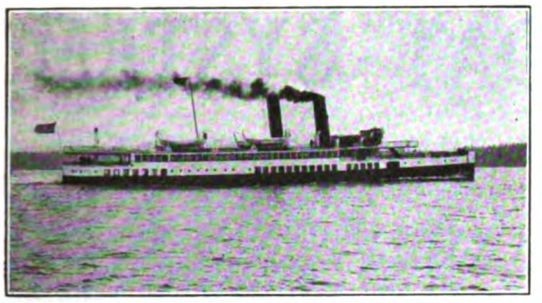
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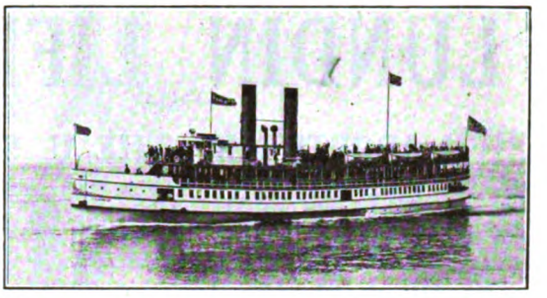
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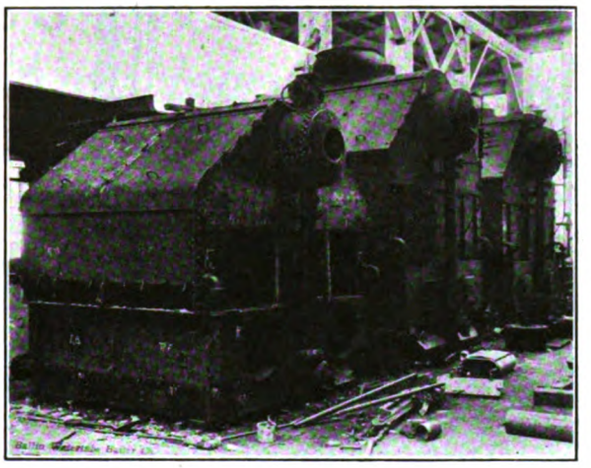
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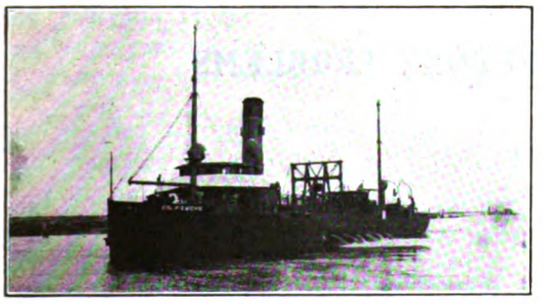


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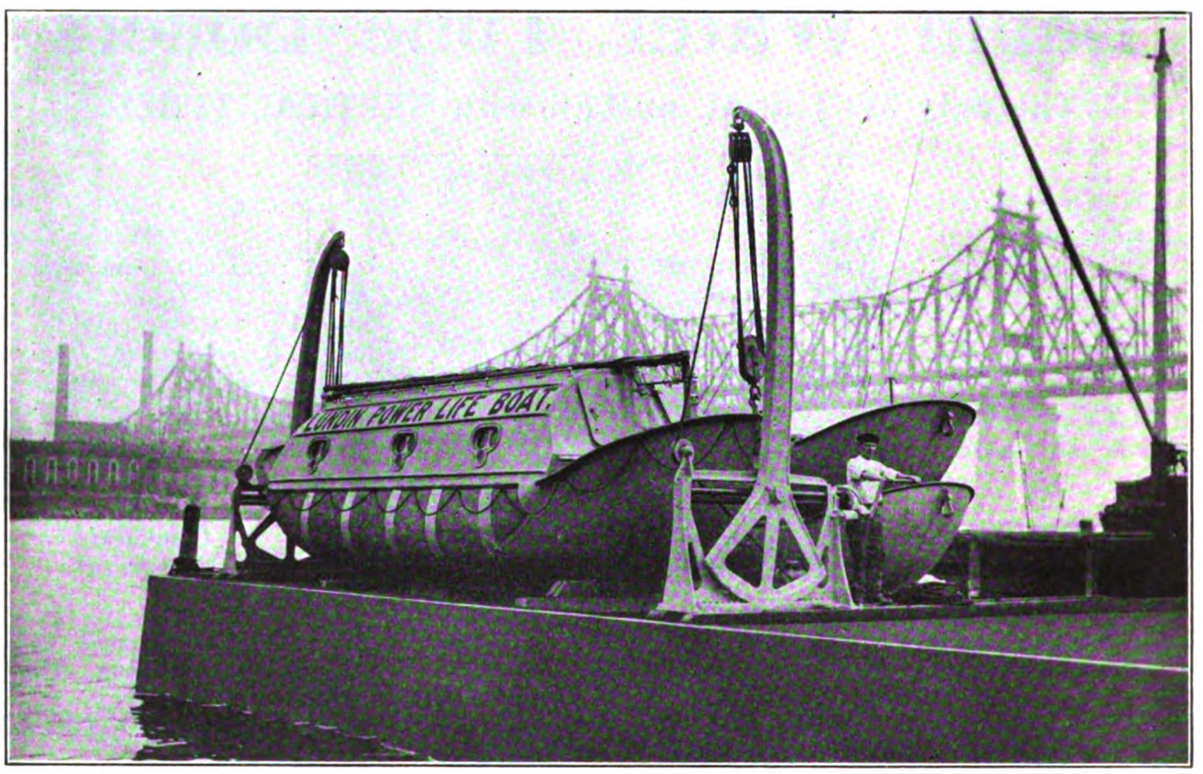
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PACIFIC MARINE REVIEW

LARGEST SHIPPING PAPER PUBLISHED IN THE UNITED STATES.

VOL. XII, NO. 6. SAN FRANCISCO JUNE, 1915.

The Effect of the War and Recent Legislation on American Shipbuilding

By G. W. DICKIE,
Vice-President American Society Naval Architects and Marine Engineers.

THE immediate effect of the war on American shipbuilding is evidenced by the fact that all the large shipyards on the Atlantic Coast are filled up with contracts and many inquiries cannot be considered where work is required to be begun at once. This is a very satisfactory condition for the present, but the continuance of this condition does not appear to be accepted by the shipowner as a certainty upon which he might venture to order new ships built eighteen months or more in advance of his present requirements.

There are many disturbing factors that enter into any calculations that the shipowner is disposed to make for his future guidance. No one can foretell what reduction in the world's tonnage the present war will lead to. If the submarine assaults upon merchant ships continue unchecked during the present year there may be a loss of 2,000,000 tons deadweight carrying capacity in the merchant service. At the same time the British shipyards, while restricted in their capacity to produce new tonnage by the demands for navy work, will certainly put afloat not less than 500,000 tons deadweight carrying capacity. Then, also, at the close of this war, many ships will be released from Government service and many more released from enforced idleness in neutral and home ports. These items will surely have to be considered and in connection with them the problem of the volume of oversea commerce to be expected after the war is over is a difficult one. How soon will the great countries involved be able to produce for export the volume of goods that they produced before this great calamity overtook them, for if they are unable to produce exports they will not be able to buy imports. These are all important factors bearing on the future conditions of oversea commerce and also affecting the future of American shipbuilding.

Recent legislation by the Congress of the United States is looked upon by shipowners as a serious menace to American shipping both in the foreign and coast trades. The bill now known as the Seamen's Act, really the Seamen's Union Act, is going to have a bad effect on shipbuilding both for the foreign and coast trades. It is thought by some people, especially those who neither own, operate or build ships, that the provisions of this Act providing that foreign vessels leaving ports of the United States shall comply with the rules therein prescribed, including the life-saving appliances, their equipment and the manning of same, will remove the evil effect it will have on American shipbuilding and shipowning. This is a fallacy, for the United States cannot force the provisions of this Act on foreign nations unless they choose to submit to its requirements. It would doubtless be a fine thing to have an international shipping act bringing all ships upon the high seas under the same rules and regulations. Such an Act, however, would have to be passed on and accepted by all the governments concerned. This country cannot make laws for the merchant marine of the world and any attempt on her part to do so, considering the pitiful part she takes in the international carrying trade, will be considered as mere impertinence. The effects of this so-called Seamen's Act will be felt only by American shipping and in some trades the result will be fatal.

The effect of that section of the Seamen's Act relating to the manning of lifeboats is going to be fatal to the coastwise passenger trade unless the good will of the Sailors' Union is secured. This is one of

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the worst features of this Act,—the fact that its operation depends entirely on how the Seamen's Union feels about things.

For several months past the writer of this article has been engaged on the designs for a large passenger and freight steamer for service on the Pacific Coast. Before this Seamen's Act was passed he had decided that the best results would be obtained by fitting lifeboats only—no liferafts—the number of passengers and crew being figured at 864. This required twelve lifeboats thirty by ten by four feet in size, each boat carrying 72 people. By the Seamen's Union Act, each of these boats will require to have four certificated lifeboat men. It is also required that a licensed officer or able seaman shall be placed in charge of each boat and as such a vessel would have nine licensed officers, viz: captain, four mates, chief engineer and three assistant engineers, there would be required three able bodied seamen to make up the list of those in command of boats. As such a vessel would carry twelve able seamen, this would leave nine of them available for certificated seamen to man the boats. There being forty-eight certificated lifeboat men required, thirty-nine of these would have to be taken from the engineer's or steward's crew.

The Act states "By certificated lifeboat men is meant any member of the crew who holds a certificate of efficiency issued under the authority of the Secretary of Commerce, who is hereby directed to provide for the issue of such certificates." The Act also provides that: "In order to obtain the special lifeboat man's certificate the applicant must prove to the satisfaction of an officer designated by the Secretary of Commerce that he has been trained in all the operations connected with launching lifeboats and the use of oars; that he is acquainted with the practical handling of the boats themselves, and, further, that he is capable of understanding and answering the orders relative to lifeboat service." There is nothing in the Act to prevent the Seamen's Union from having an understanding with the Firemen's Union and the Waiters' Union that none of their men shall apply for a lifeboat man's certificate, nor is there anything to prevent the holders of such certificates from demanding that the possession of that important slip of paper entitles the holder to substantial compensation over and above the regular pay of his class.

This Act has placed the operation of the ocean passenger steamship entirely in the hands of the Seamen's Union and it depends entirely on how this Union uses the power granted to it by Congress as to whether the American steamship carrying passengers will be able to do any business and whether any more ocean passenger steamships will be built in the shipyards of this country.

The Seaman's View of the Seamen's Act

WE reproduce below a letter to the San Francisco Chronicle by Mr. Andrew Furuseth, President of the Seamen's Union, anent the Seamen's Act:

"Editor The Chronicle—Sir: Your editorial of May 1st, dealing with the so-called Seamen's Act, contains much misinformation to which I am desirous of calling your attention. The most casual reading of the act must convince any person that the law places no burdens upon the American vessel that is not also placed on all foreign vessels coming to our ports.

"The seamen of all nations will have the same right to personal freedom while within the jurisdiction of the United States. Japanese will be no exception. The editorial intimates that the Japanese seamen will not avail themselves of this freedom. Looking over your files you will find plenty of reports showing that the Japanese seamen are not only eager to become free upon arrival here or elsewhere, but that they are risking their lives to leave the vessels upon which they are serving, and, in fact, it is not a rare thing to read of some of them dying in the attempt. The reports of the immigration bureau show that the Japanese desert from the Japanese liners in our ports.

"The presumption that the Japanese Government will pass new laws to punish Japanese seamen for desertion on their return to Japan has its origin in a wish that this may be done. Neither your informant nor anyone else has any right to presume that the Government of Japan will change its policy because of this change in our law. It may, of course, be done, but it would only mean that those Japanese would not come back to Japan.

"The policy of Japan has been to encourage its people to travel and to bring back to Japan such knowledge as they could gather. Only a few years since the Government of Japan offered a premium to be permitted to place young men on vessels on this Coast as apprentices. Japan is not asking any special privileges over those enjoyed by other people while in this country.

"No person reasonably well informed will deny that Japan is driving the vessels of other nations from Asiatic waters. The low cost of operation makes this easy as the laws now stand. We can not come down to their cost. Under existing law and custom the sea must become the domain of those who can do it cheapest. The Oriental can do it cheapest. They are in the fireroom and on deck to-day. They therefore must be in the engine-room and on the bridge to-morrow. They will own and operate the vessels later.

"Congress, by releasing the laws of economics and of wages, places low-wage countries on equality with high-wage countries, and makes it possible to compete with Japan. Japanese seamen will have to be paid enough wages and given sufficiently decent treatment to cause them to stay by their vessels voluntarily, or their routes will be so disarranged as to make them unprofitable. The policy followed by our country has left us without seamen and without vessels in the foreign trade. There was time for a change. It is indeed difficult

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to understand the policy of the papers that are playing into the hands of foreign shipowners and governments by attacking this new law.

"Very truly yours,

"ANDREW FURUSETH.

"San Francisco, May 3, 1915."

Mr. Furuseth's letter is clearly that of a man who, through long years of agitation on one side of a question, has worked himself into a groove and has shut his eyes to all true perspective and closed his ears to all argument save that which furthers what he believes to be the interest of the Union sailor.

In the letter printed above, he claims that no man has a right to the presumption that Japan will change her policy to meet the exigencies of the Seamen's Act, and in the same breath he tries to take advantage of the assumption that she will not. We believe, with Mr. Furuseth, that Japan will not change her policy. Her ambition is to become the maritime dominator of the Pacific in the same sense that England came to rule the sea-lanes of the Atlantic. We hardly think that this statement of Japan's aims can be seriously questioned, nor can we see any reason for the Nipponese government changing its policy at a time when the United States is doing all in its power to further the Japanese dream of dominion upon the ocean.

Japanese sailors occasionally desert at San Francisco or elsewhere, but what of that? The sailors of every nation, including America, do precisely the same thing and are often allowed to escape without any serious attempt at capture. Sometimes the master of a vessel is very glad to get rid of a black sheep or two out of his crew. Mr. Furuseth knows, however, that the desertion of a sailor now and then bears no analogy to the possible desertion of entire Japanese crews under the provisions of the Seamen's Act. The language clause of this Act prevents the shipment of a mixed crew at an American port, and in case of crew desertion a Japanese ship would have to secure a Japanese crew in order to obtain her clearance. If the original crew would not return to its work and a new crew of Japanese was not obtainable, the vessel would be refused clearance papers and the aggressive foreign policy of Japan during the past thirty years is ample proof of the fact that a very serious problem would be upon our hands. Again, is Mr. Furuseth going to welcome Japanese sailors into his Union, or is he going to persuade them to desert and then leave them to the tender mercies of Providence and the Associated Charities?

It will be noted in Mr. Furuseth's letter that he carefully avoids the question of Chinese crews. In the case of the Japanese, he avoided the issue, claiming that those opposed to the Seamen's Act had no right to an assumption that Japan would alter her laws in regard to deserting sailors. Now why did Mr. Furuseth sidestep the Chinese crew question? Because the assertion of half truths and uncompleted statements can not possibly dispose of this phase of the subject and because Mr. Furuseth does not dare to voice his advocacy of the only action on the part of the United States Government that would make the Seamen's Act effective on foreign ships carrying Chinese crews with either Chinese or Japanese officers. To use Mr. Furuseth's own phrase, "The most casual reading of the Act must convince any person that" the only thing that will make the Seamen's Act have the slightest effect on Japanese or Chinese owned and manned vessels is the abrogation of the Chinese Exclusion Act and a hearty welcome to Japanese colonization.

In the matter of assumptions, Mr. Furuseth would deny these to those opposed to the Seamen's Act and at the same time he hugs to his breast the most stupendous piece of arrogance ever dreamed of by this or any other Nation, and that is the assumption that the United States, a country whose place on the high seas is negligible, can dictate the manner in which the great maritime powers of the world will make use of the oceans.

"Congress, by releasing the laws of economics and of wages, places low-wage countries on equality with high-wage countries, and makes it possible to compete with Japan." Congress has nothing to do with the laws of economics, nor can it change or alter them in any way outside of the confines of the United States. The Japanese sailor on a Japanese vessel will never receive as high a wage, measured in dollars and cents, as the sailor on an American vessel. The wages prevailing in different countries can not be measured in terms of any monetary system, but are related to each other directly in proportion to their purchasing power. In other words, the equalizing of American and Japanese wages in the only way in which they can ever be equalized would still leave the American ship hopelessly overburdened as far as operating expenses were concerned. Japanese seamen at $55 per month serving on Japanese vessels would completely demoralize Japan's economic system and that country is not going to allow itself to be thrown into an economic revolution to please the Sailors' Union. The sole purpose of the Seamen's Act is to raise the wage of members of the Seamen's Union of the United States and to tighten that body's grip upon shipping.

Granting that the union will be able to handle the coastwise shipping situation in any way it sees fit, it is obvious that the law's only result as far as off-shore vessels are concerned will be the retirement of American vessels to be replaced by the ships of whatever nations, to be honestly blunt about the matter, refuse to be bluffed out of their rights to operate their own shipping in their own way.

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The United States Coast Guard

By CHAS. A. HARBAUGH

WHEN Congress by Act of January 28, 1915, created the United States Coast Guard, it put through the biggest piece of humanitarian legislation ever enacted by the law-making body of any country.

In keeping with the spirit of altruism which has given our land a position unique in the family of nations, the benefits of this law will not be confined to our own people. They will be world-wide. All the ships of the seven seas, the commerce of the world, passing along our shores, will be under its beneficent protection.

The names of the Revenue-Cutter Service and the Life-Saving Service have long been familiar to shipmasters, and others whom business or pleasure has taken to sea. The Coast Guard is the product of these two organizations, merged by legislation that will permit the rescue and salvage work heretofore performed by each to be carried on along more comprehensive lines than have ever before been attempted. It is expected to accomplish this by improved methods and better equipment, by a closer cooperation between the vessels and shore stations of the service, and by a reorganization of the personnel of the corps of the late life-saving establishment. This last-mentioned reform—by far the most important of all—is made possible by a provision of law which permits the retirement of superannuated and otherwise incapacitated surfmen, thereby furnishing an opening for, and offering a strong incentive to, young and vigorous recruits to take up the vocation of life-saver.

As was the case with the Revenue-Cutter Service, the Coast Guard will be conducted as a military organization, Congress having declared the new establishment to be a part of the military service of the Government. As was the case, also, with the service first mentioned, it will continue under the control of the Secertary of the Treasury in time of peace. Should the country go to war, however, it automatically becomes a branch of the Navy.

As a unit of the military establishment, this newly created bureau, by its constant state of preparedness, will undoubtedly meet a situation that has long been a matter of concern to the Government—it will supply, without the delay incident to recruiting and drilling, a corps of officers and men to the number of 4100. This compact organization of trained and thoroughly disciplined men will serve as the nucleus around which may be speedily gathered a fighting force capable of entering upon any military enterprise demanding immediacy. Indeed, the motto of the service, a motto that has shone resplendent from every cutter that has sailed the seas since the year 1790, is "Semper Paratus," which, in every-day English, means "always ready."

The history of the Revenue-Cutter Service runs back almost to the birth of the Republic; it actually antedates the American Navy by several years. It had its beginning in 1790, in which year Congress appropriated money to build ten "cutters" to run down vessels engaged in smuggling. Hence the name "revenue cutter"—a name the service outgrew when sails gave way to steam as a means of propulsion for vessels.

Several years later these revenue cutters, their number augmented, were performing the duties of the naval establishment by specific authority of Congress, which directed their employment for the purpose of defending the seacoast and repelling any hostilities. Gradually, as our trade with other nations increased and maritime commerce along our coasts exposed an ever-increasing number of vessels to dangers of rock and shoal, the fleet of revenue cutters took up the duty of protecting shipping from the perils mentioned. In this connection we find a law passed in 1837, requiring them to "cruise upon the coast in season of severe weather, and to afford such aid to distressed navigators as the circumstances may require."

From year to year the scope and variety of the work performed by this effective agency broadened under Congressional dictum and Departmental regulation. As indicating this, one may find, for instance, in the records of the service, reports of cutter officers telling of the suppression of piracy, the capture of slavers, and the apprehension of filibusters. To-day these cutters, grown to a fleet of forty or more efficient steamers, are also charged with the duty of locating and reporting icebergs found in the lanes of ocean travel, furnishing hospital treatment to deep sea fishermen, destroying derelicts, and enforcing navigation, quarantine, neutrality and immigration laws.

The late Life-Saving Service, while unable to boast so long a record as her elder sister of the sea, may nevertheless point with pride to a history, which, if shorter, is no less distinguished for achievement. This establishment grew from a few little boat houses placed upon the coasts of New Jersey and Long Island in the '40's and '50's. These original stations, so-called, were without adequate equipment, they had no responsible custodians, and sheltered no regularly employed crews. It is not surprising, therefore, that they failed lamentably to justify even the limited and irregular appropriations made for their maintenance.

Along in the '70's Congress awoke to the necessity

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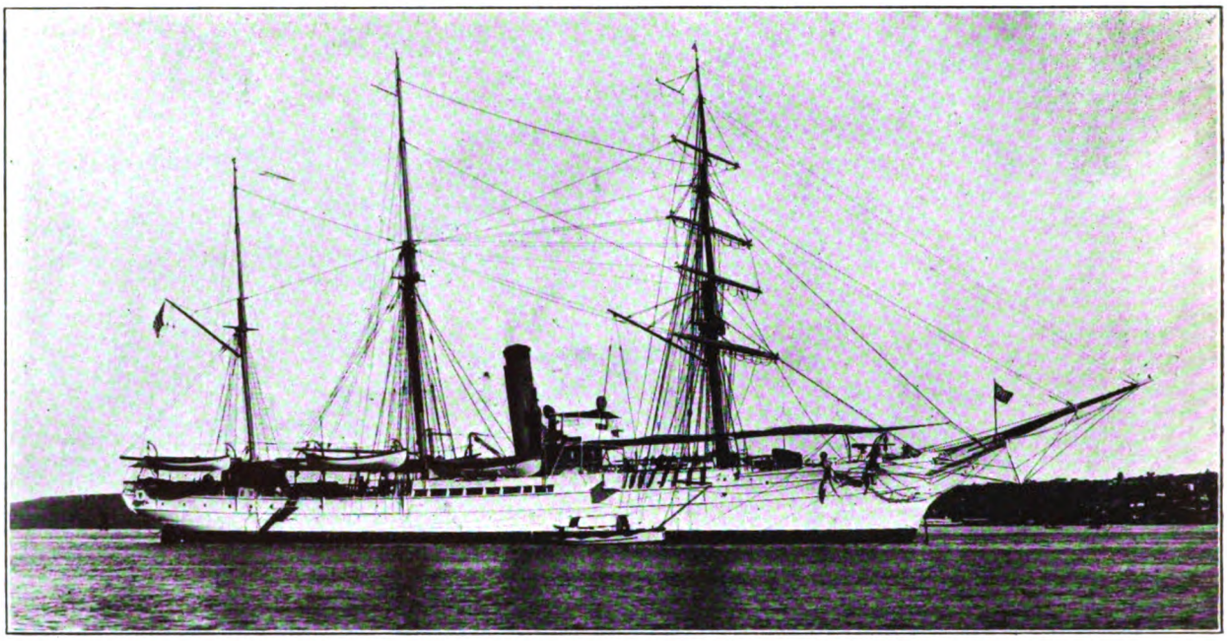


The Coast Guard Cutter "Thetis" in the Ice in the Arctic Ocean.

of having a life-saving service on land as well as on sea, and the late life-saving bureau, created in the year 1878, was the result. Under able direction this service, also, rapidly won high place among humanitarian institutions of the world. Unlike the Revenue-Cutter Service, however, its duties were practically limited to saving life and property from shipwreck. Starting with a few miserable boat shelters, as already mentioned, the service was extended from time to time under the fostering care of the Government until, when it lost its identity in the name of the Coast Guard, it embraced nearly 300 well-found stations and an efficient corps of 2200 surfmen, and afforded protection to shipping along nearly 10,000 miles of sea and lake coast.

What these two old organizations will accomplish,

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The Coast Guard Cutter "Bear," a familiar vessel on the Pacific Coast.

working under one banner, and infused with new blood, new ideas, and a strong, virile, alert directing power, remains to be seen. The future of the Coast Guard may be forecasted with a fair degree of accuracy, however, after a glance at the tabulated results of one year's work—that for 1914—and the last in which the two former organizations operated separately:



Captain Commandant E. P. Bertholf, Chief of the newly organized U. S. Coast Guard.

Operations of Revenue-Cutter Service, 1914.

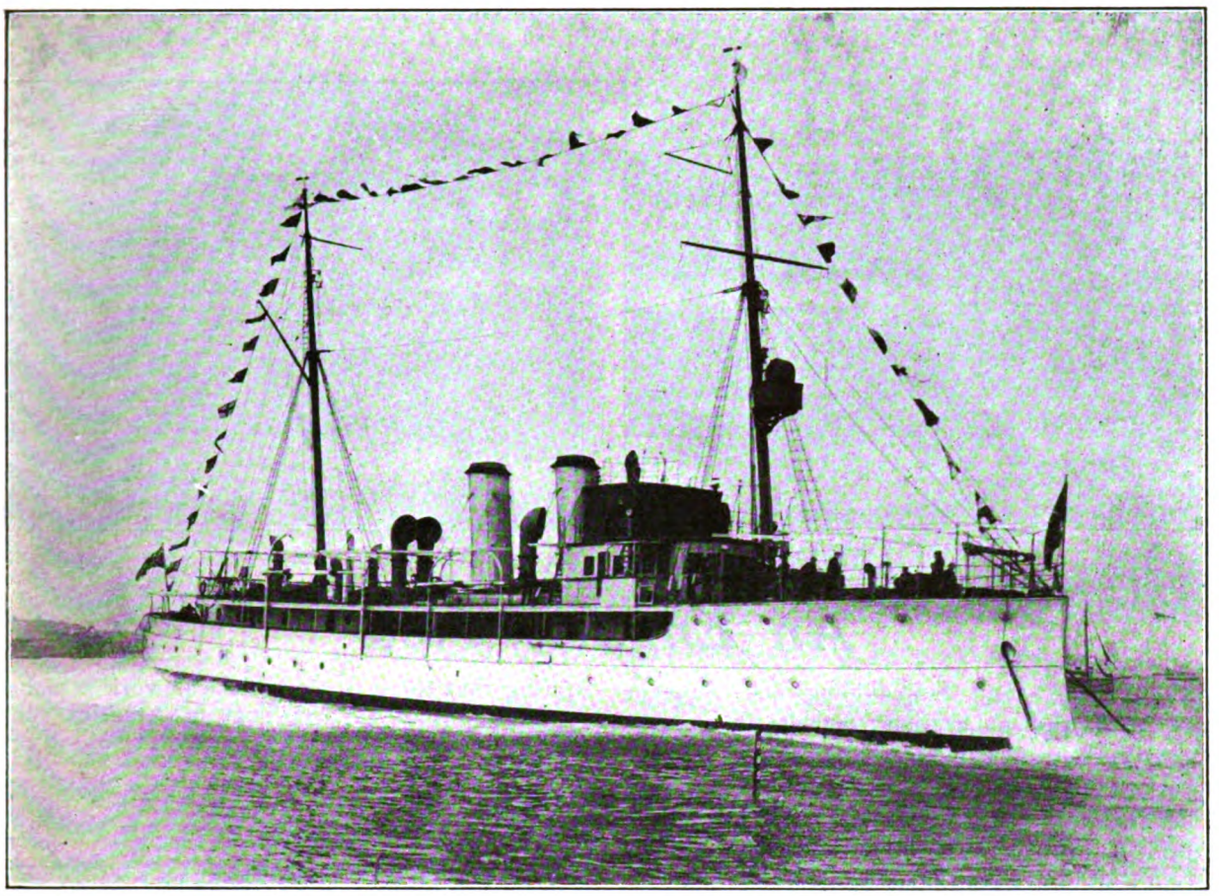
Lives saved or persons rescued from peril	476
Persons on board vessels assisted	1,687
Persons in distress taken on board and cared for	487
Vessels boarded and papers examined	28,787
Vessels seized or reported for violation of law	968
Fines and penalties incurred by vessels reported	$204,310
Regattas and marine parades patrolled, in accordance with law	50
Vessels to which assistance was rendered	210
Derelicts and obstructions to navigation removed or destroyed	31
Value of vessels assisted (including cargoes)	$9,056,551
Value of derelicts recovered and delivered to owners	$145,000

Operations of Life-Saving Service, 1914.

Number of vessels involved	1,937
Vessels totally lost	82
Persons on board	9,296
Lives lost	38
Persons conveyed to land or elsewhere to safety	4,762
Persons succored	920
Days' succor afforded	1,234
Value of vessels involved	$17,304,840
Value of cargoes	4,203,020
Total value of property involved	21,507,860
Value of property saved	18,783,200
Value of property lost	2,724,660

Omitting consideration of the most important

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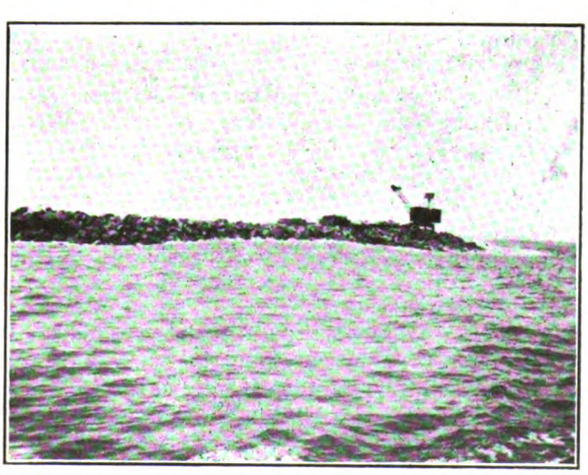


Canadian revenue cutter "Margaret." This class of boat performs many of the functions of our own coast guard vessels along the Canadian coast.

items of service in the foregoing statements—those relating to the saving and succoring of victims of shipwreck and other marine casualties—items the importance of which cannot be expressed in the terminology of money, there remains enough in the tables to hold the attention of one with an eye for problems in finance. The two services were instrumental in saving, during the year under notice, property amounting in value to several times their combined cost within the same period.

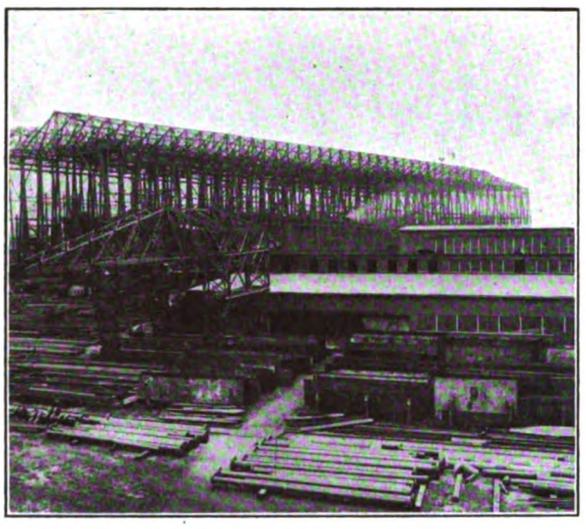
During the summer of 1914 the Department of Commerce, through the Bureau of Fisheries, conducted an exploration of certain fishery grounds off the coast of Oregon and Washington to determine, particularly, if halibut were present in sufficient quantities to support a fishery. The fishery steamer "Albatross" was used for this survey. The survey covered, as well as time permitted, the area inshore of the 100-fathom curve, from just north of Grays Harbor, Wash., nearly to Cape Blanco, Ore. A halibut ground of some value was found off Newport, Ore., covering an area of approximately 250 square miles. The run of fish on this bank reaches its maximum in August and September, but apparently is of commercial importance as early as June, and probably some halibut could be taken in the latter part of April. As an immediate result of the "Albatross" findings, fishermen made 21 trips to the ground, taking about 850,000 pounds of halibut, valued at about $24,000. Trips yielding 40,000 pounds were made in four days or less. Irrespective of the abundance of fish, weather conditions, and the lack of harbors will inhibit fishing excepting from April to October. Several smaller areas off Grays Harbor and Coos Bay may be expected to produce halibut in limited numbers; and the entire coast of Oregon was found to abound in flounders, soles, rock cod, and black cod—a valuable food supply when market conditions warrant its exploitation.

The report on the investigation, with charts, will soon be issued, and may be obtained on application to the Bureau of Fisheries, Washington, D. C.



End of the South Jetty, Humboldt Bay.

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The ship sheds and slips at the Union Iron Works.

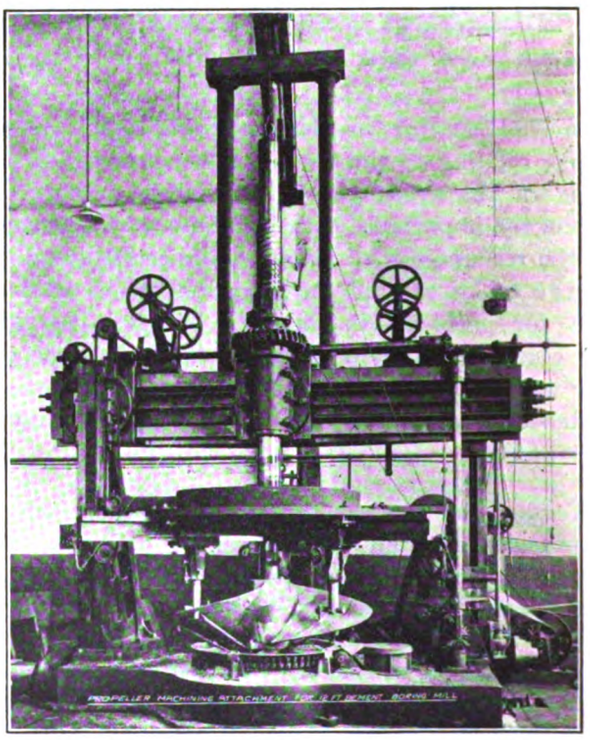
An English View

The following from Shipbuilding and Shipping Record, an English publication, coincides in some respects with views frequently expressed in the Pacific Marine Review anent American shipbuilding. We have always maintained that while a freighter could not be built in America as cheaply as abroad, the American built cargo boat is a far finer article—using the word "finer" in a restricted sense as meaning better finished·

"A number of orders have lately been placed with American shipyards by various owners, chiefly for oil tankers, and the outlook for the industry has much improved within recent weeks. It is doubtful, however, if the prices at which these orders have been booked will leave any room for profits, although this is a contingency seldom taken into account by American builders when booking orders, if one is to judge by financial results. On an oil tanker illustrated a few months ago in Shipbuilding and Shipping Record the builders dropped as much as $190,000, and they have now booked an order for practically duplicates of this boat at prices only about 15 per cent. in excess of the figure obtained for the first boat. One might look far and wide in this country to find a steamer of large tonnage on the construction of which the builders made a profit, and such a thing as a dividend has never been known to the stockholders of American shipbuilding companies on the Atlantic coast.

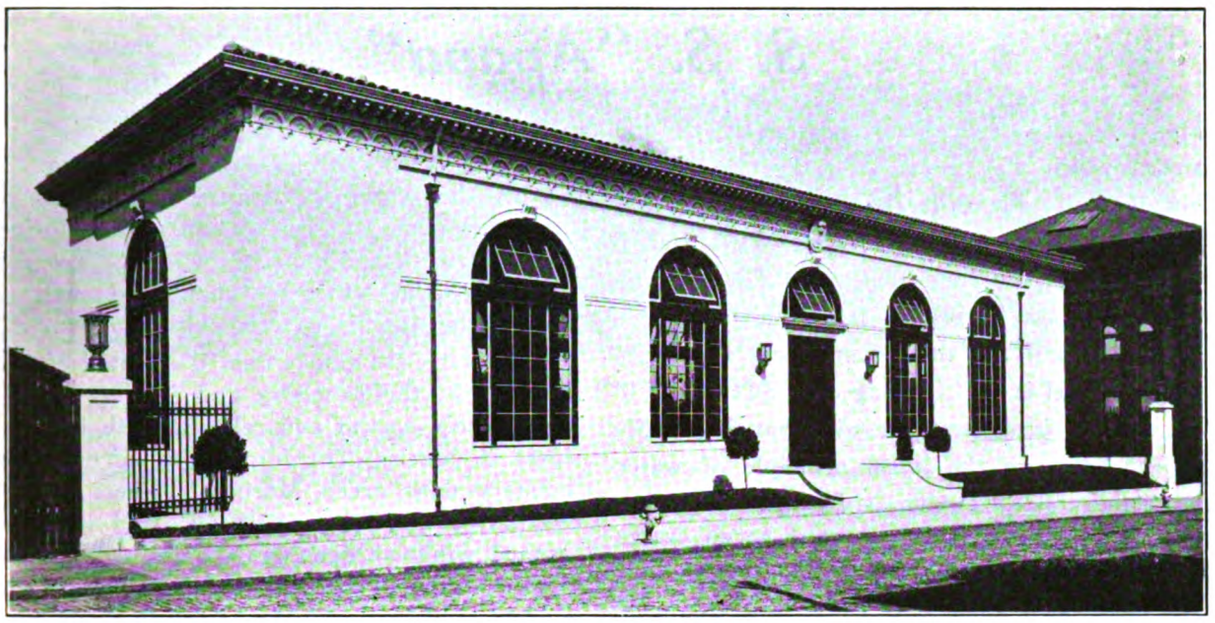
"An economist would be puzzled to discover the financial reason for the existence of most American shipyards. They certainly are not being run for profit, and while they constitute an important national asset in affording means to keep up the strength of the navy, the Government has done all in its power to squeeze the contractors. In fact, the navy work, which keeps the yards going—for on such work alone, especially destroyers, is any profit ever made—has also been responsible for their failure to achieve financial success in mercantile work. The building of a cargo-boat is as intricate an operation at an American yard as the construction of a battleship. The routine is practically the same, and there is no exaggeration in stating that there is more clerical work attached to the building of a cargo-boat in America than to the building of a battleship for H. M. Navy in Great Britain.

"Cargo-boats turned out of American yards are seldom of standard type. They are generally of special design for a certain trade. The quality of the work is equal to the best of any country, but the exacting routine of naval construction has snuffed out any individual spirit in the labor element, and every detail, be it ever so small, originates in the drawing office. The drawing office is both the heart and the brain of an American shipyard, and without it nothing can be accomplished. Not a detail of outfitting escapes the attention of



A special rig for machining propeller blades.

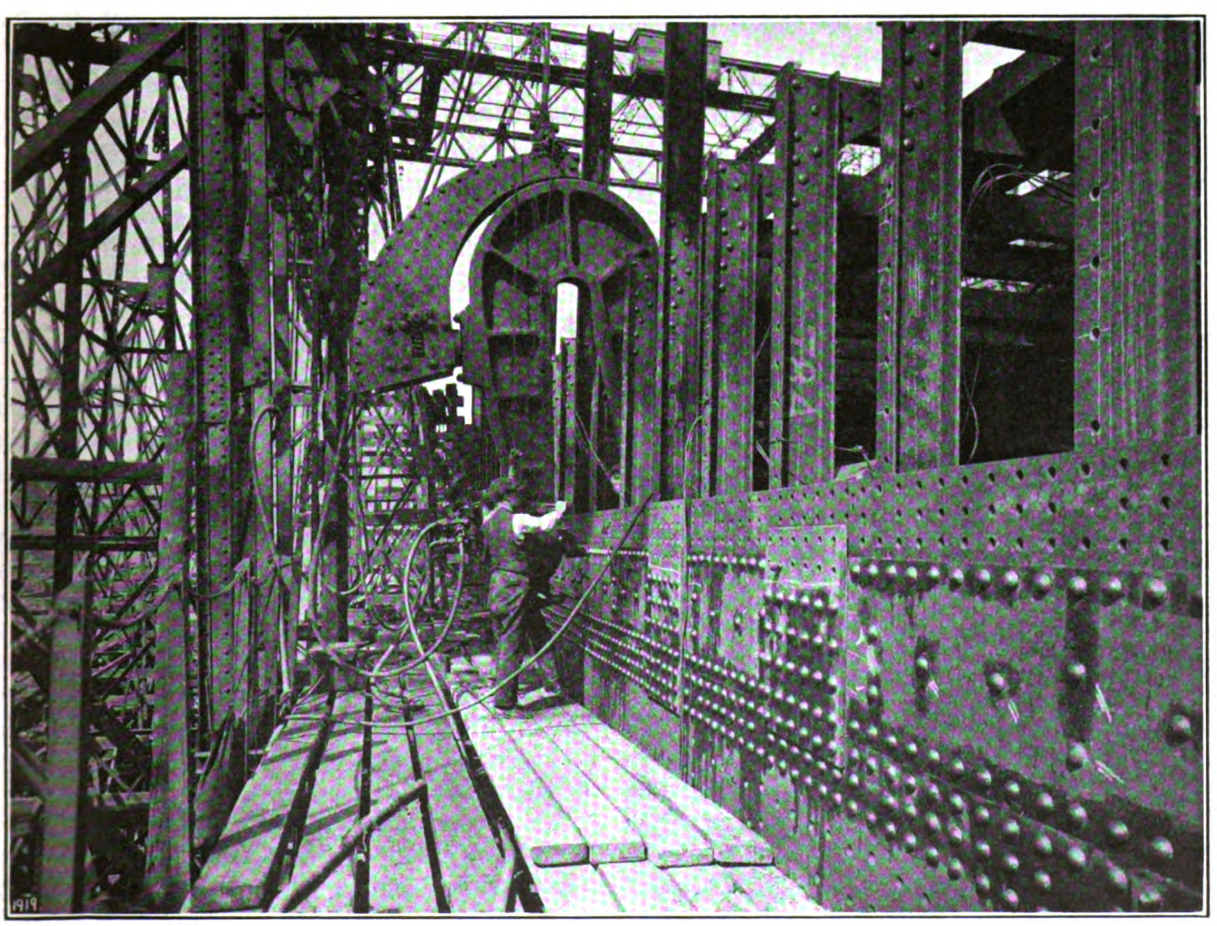
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A plant that looks to beauty as well as utility. Power house at the Union Iron Works.

the naval architect in charge of the drawing office, and a plan must be drawn for every erection, whether structural or otherwise. The wonder is not that American ships cost so much, but rather that they cost so little, in view of the tremendous overhead expenses of the shipyards and the superior grade of workmanship and outfitting details.

"The same blight has fallen upon the American shipbuilding industry as upon that of Germany. Both enjoy the benefit of the highest degree of technical skill obtainable, and have good material to draw upon as regards labor and steel. They can both show wonderful examples of technical organization, but the incidentals have been allowed to replace the fundamental principle of any industrial pursuit, to wit, profit-making; and, as organized to-day, neither the German nor the American shipbuilding industries can possibly compete with the British as an economical factor in the shipping world of the present era."



The great liners built in British shipyards call for very heavy riveting tools.

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S. S. "Apapa"

This fine, large twin screw passenger and mail steamer, which has been built by Harland & Wolff, Ltd., to the order of the African Steamship Co., London (Messrs. Elder, Dempster & Co., Ltd., managers), left Belfast on Thursday the 4th of March for Liverpool, from which port she will shortly sail for the West Coast of Africa. The new vessel is 441′ 0″ long over all and 57′ 0″ beam, with a gross tonnage of about 8000. She has been built on the latest principle of watertight construction, having six watertight bulkheads dividing the structure into seven watertight compartments, and the double bottom built on the cellular principle extends right fore and aft, specially strengthened in way of the engine room. There are five steel decks and in general design and construction the "Apapa" represents the highest attainments in British shipbuilding for a first-class vessel of her size and type. In addition to having large cargo capacity, the "Apapa" is fitted up with sumptuous accommodation for a large number of first and second class passengers, the permanent first-class rooms being single and two-berth rooms, the second two and four berths, and the third class also two and four berth rooms. There is in all accommodation for about 400 passengers.

The first class staterooms, situated in large deckhouse on the bridge deck, are nearly all single berth rooms fitted with cot bedsteads, and those on the awning deck and main deck are two-berth rooms arranged on the tandem principle, giving natural light and ventilation to all rooms and eliminating what are known as inner rooms. The upholstery is cretonne, the furniture mahogany, and carpeted floors. The first class suite staterooms on the awning deck have toilet and lavatory attached. One of the rooms is panelled and framed in oak, with oak furniture; the other finished white, with oak furniture and floor covered with Brussels carpet.

The first class public rooms are arranged and decorated in the most approved style. The dining saloon on the main deck extends the full breadth of the vessel and will seat 150 persons. The floor is covered with linoleum tiles; the upholstery is green leather. The room is furnished with small rectangular tables in the restaurant style, and handsome sideboards at forward and after ends. The sidelights are of large diameter arranged in pairs, and the saloon is panelled and framed in white enriched "Adams" style.

The first class lounge, on the bridge deck forward, is panelled and framed in sycamore, relieved with carving. The upholstery velvet, and the room has large teak framed windows. There are two bookcases at the after end, and handsome sycamore piano at forward end. The furniture is of wickerwork and consists of lounge easy chairs, settees, writing tables and chairs and small square tables; the floor is covered with linoleum tiles.

The first class smokeroom is situated aft on the boat deck; the panelling and framing is in oak, handsomely carved and relieved with inlays; pictures in panels. The furniture is of oak, the upholstery dark green Morocco. There is a large decorative skylight overhead, and large teak framed windows opening in pairs. The furniture consists of small card tables, settees, writing tables and tub chairs, and two sideboards at forward end. The floor is covered with linoleum tiles. At the after end of the smokeroom an open verandah is arranged with small teakwood tables and chairs, and bar and gentlemen's lavatory adjoining.

The first class companionway, stairway and entrance are panelled in oak, and there is a large decorative dome over the main entrance.

The second class accommodation is also well arranged and of a high class character. The staterooms, situated on the main deck, as already mentioned, are arranged in two and four-berth rooms on the tandem principle. They are upholstered in figured repp, and have mahogany furniture.

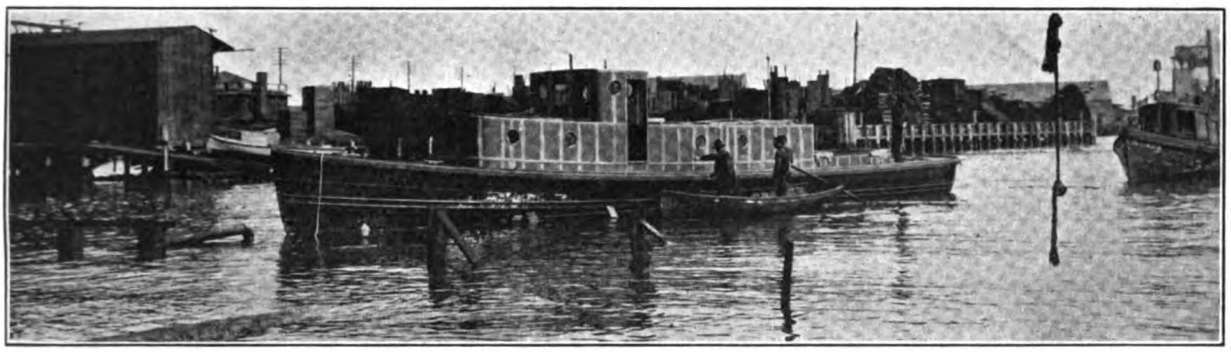
The third class accommodation consists of the staterooms on the main deck aft, dining saloon on the same deck, and the general room at the after end of the awning deck. Both these rooms are finished white and are very comfortable compartments.

There is a gymnasium on the boat deck, fitted up with a large number of electrically driven apparati, a darkroom arranged in the after first class entrance on the awning deck, a barber's shop, and, of course, the usual purser's office, doctor's room, etc. The ship's refrigerated chambers and dry storerooms, on the lower deck aft, are of ample capacity. The appliances for working ship and cargo are of the latest type, and the vessel, in addition to having a complete installation of electric light, is fitted with wireless telegraphy apparatus. Wash house and ironing room with electric irons is fitted at after end of poop deck.

There are large spaces on lower deck forward fitted up for the carriage of parcels.

The propelling machinery consists of two sets of four-cylinder quadruple expansion "Balanced" reciprocating engines, also constructed by Harland & Wolff, Ltd.

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Launch of the Union Iron Works "Number Five."

UNION IRON WORKS COMPANY INCREASES ITS FLEET.

In line with the general policy adopted by President John A. McGregor for bettering the service of the company to its customers, a fifth vessel has been added to the fleet of the Union Iron Works Co.

The boat is 65 feet long, 12 feet beam and 4 feet 9 inches deep, and is built almost entirely of steel, including house and cabins. A compromise of strength, carrying capacity and speed has been combined into one model. Seating capacity is provided for about fifty people and as many more can comfortably find standing room in an emergency.

The propelling power consists of a six-cylinder gasoline engine of the speedway type capable of developing 200 B.H.P. at 1000 revolutions per minute. The engine was manufactured by the Gas Engine & Power Company and Charles L. Seabury & Company, Consolidated, Morris Heights, New York City, and was purchased through their local representatives, Henry Hyde Company.

There are three steel bulkheads, dividing the hull into four water-tight compartments, thus rendering the boat practically unsinkable. The forward cabin is entered through the pilot house and is furnished with mahogany seats upholstered in Spanish leather and connected with lavatory and toilet. The after cabin and cockpit are fitted with teak seats. With the exception of the cabin floors and iron bark guard at the deck line, all other material is metal.

As most of the landings are made alongside of floats, two rubbing fenders of steel have been fitted about 12 inches above the water line to protect the paint on the sides and prevent indentations due to continual bumping.

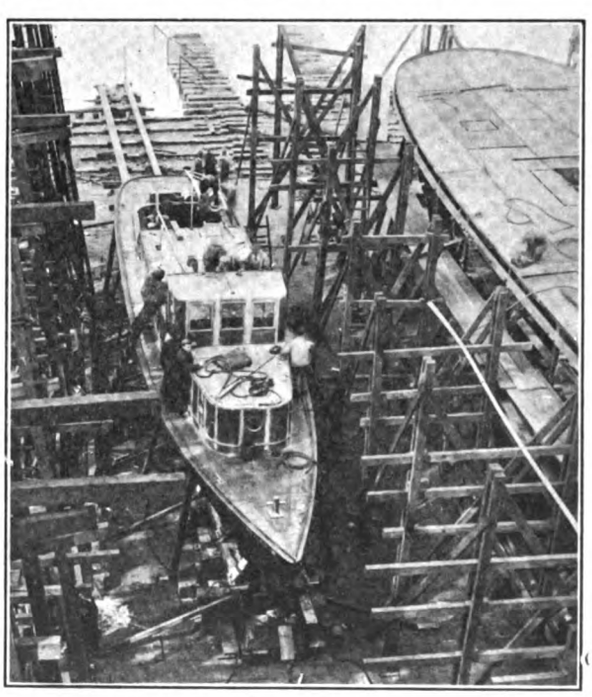
Although a speed of 21 miles can be easily maintained when demanded, it is intended to operate the boat at 18 miles per hour in regular service.

CRAIG TO BUILD "CEDAR."

The Craig Shipbuilding Company of Long Beach has secured the contract to build the new lighthouse-tender "Cedar" at a price of $234,500. This craft is intended for service in Alaskan waters and is to be the most pretentious of any of the tenders in the lighthouse service. She will be 200 feet long, 1750 tons displacement and have propelling machinery of 1300 horse-power.

The Seattle Construction and Dry Dock Company recently completed extensive repairs on the British steamer "Epsom." The work consisted in the renewal of about sixteen plates forward and the removal of the temporary repairs in the shape of cement work and cofferdams, repairing of tank tops, steam pipes on deck and piping in No. 4 hold. The work cost in the neighborhood of $30,000.

Mr. C. K. Magill has been appointed Puget Sound agent of the American-Hawaiian Steamship Company, with headquarters at Seattle.



"Number Five" on the ways.

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The Working of a Large Motor Ship

By J. RENDELL WILSON.

SINCE the recent revival of interest in the high-powered marine Diesel type engine many American shipowners have been eagerly anticipating an inspection of one of the Werkspoor-engined ships, because of the reported remarkable success of the 14 vessels that have been so equipped in Europe, and when I learned that one of these craft had put in at Philadelphia, I gathered a small party of shipowners and on April 30th journeyed over from New York. Owing to all the Werkspoor-engined craft being engaged in the Far East trade, there had been no previous opportunity for shipowners in this country to satisfy themselves as to the merits, or demerits, of this particular design of propulsion. Our visit was more than well worth while, because of the valuable information freely given us by the chief engineer and captain, regarding her operation.

The vessel in question is the "Emanuel Nobel," now on charter by the Sun Oil Co. of Marcus Hook, Pa., and which has just made a voyage from Rouen, France, to Philadelphia, in 14 days, fully loaded. The following are the general details of the ship and her machinery:

Motor Tank-Ship "Emanuel Nobel."

Owners, Societe Anonyme d' Arment d' Industrie et de Commerce of Antwerp.

Hull builders, Netherlands Shipbuilding Co. of Amsterdam.

Engine builders, The Werkspoor Co. of Amsterdam.

When completed, 1913 (January).

Displacement, 9000 tons.

Cargo capacity, 2,000,000 gallons approximately.

D. W. capacity, 6500 tons, including 350 tons fuel and 30 tons stores, 100 tons water, 40 tons drinking water.

Length, 390½'.

Beam, 51'.

Molded depth, 29'.

Draught, 23' 5½".

Screws, twin.

Speed, 11½ knots.

Engines.

Number, two six-cylinder sets.

Type, Werkspoor designed and built, direct-reversible, single-acting four-cycle Diesels.

Bore, 22".

Stroke, 39 3-8".

Revolutions (maximum), 125 R.P.M.

Indicated H. P., 1360 per engine. In actual service the combined power developed is about 2650 I.H.P. at 105 R.P.M.

Brake H.P., 1020 per engine.

Length per engine, 27' 3".

Width per engine, 8' 6½".

Height above shaft, 16' 9".

Lubrication, sight-feed drip.

Lubricating oil consumption, about 36 to 40 gals. per day.

Fuel consumption (including auxiliaries), not over 9 tons per 24-hour day in summer, and 9½ to 10 in winter (or 0.31 lbs. per I.H.P. hour in summer).

Weight per engine, 122 tons.

This consumption includes the fuel for all auxiliaries, and this great economy is effected by utilizing the waste exhaust gases of the main engines to fire the two donkey boilers. When the main engines are not running, oil-fired burners are used.

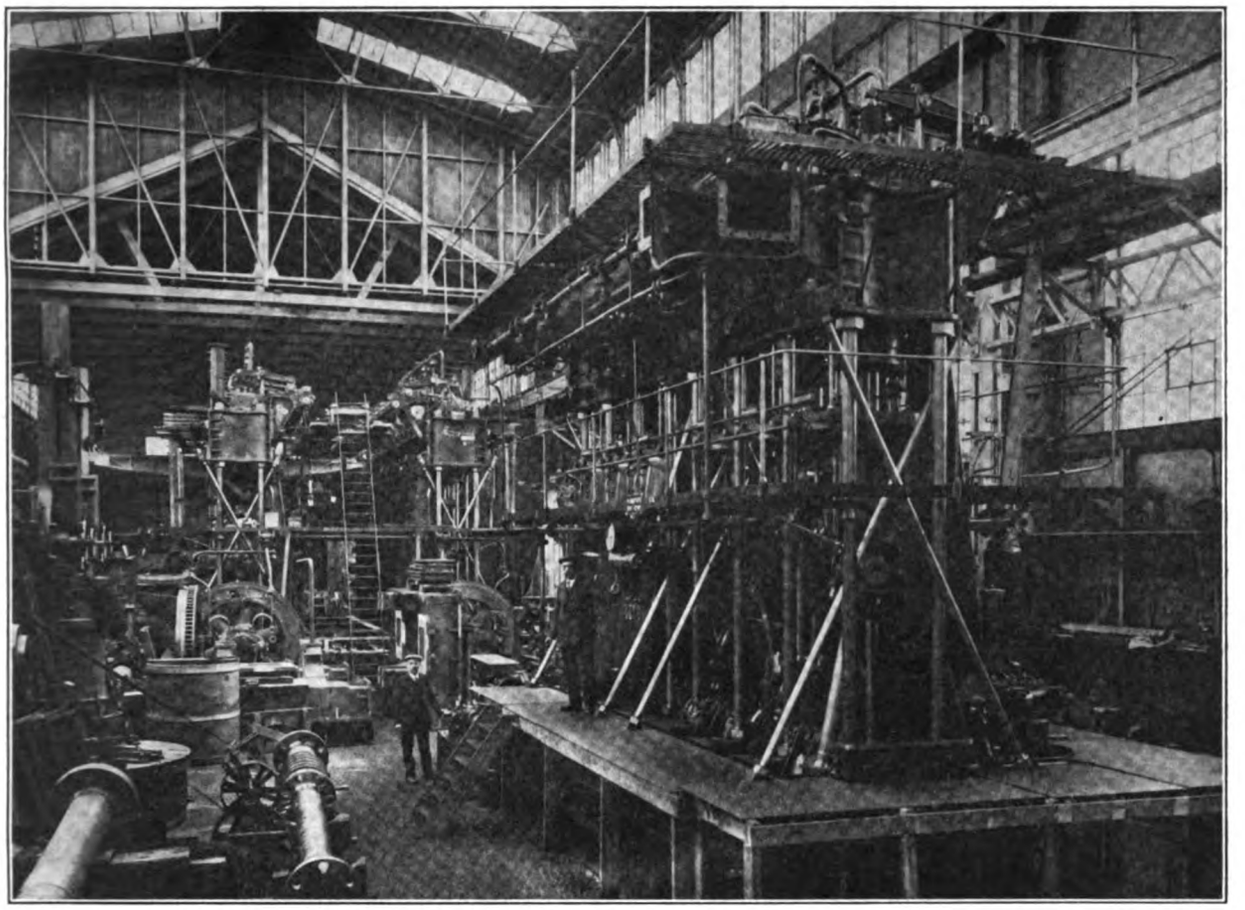
The engine-room staff consists of 12 men all told, consisting of four engineers, three assistants, three greasers and two cleaners, which compares with 17 men in a similar sized steamship.

Originally three-bladed propellers of 11' 1" pitch were fitted, which, turning about 115 R.P.M., gave the ship a speed of 11½ knots; but the vibration was so excessive that four-bladed propellers of 12' pitch were substituted. This entirely eliminated vibration, but owing to there being 30 per cent. slip the speed was reduced by ½ knot, so it is evident that more efficient propellers would increase the speed of the ship, particularly as the maximum possible revolutions are 125 per minute. At present the engines average 105 R.P.M., at which speed 2650 I.H.P. is developed, giving 11 knots loaded, or unloaded, the latter condition making no difference to the speed, owing to the angle of the hull when running light, because of the engines being set aft. The power, however, of 2650 I.H.P. is excellent for the cylinder dimensions of the engines.

It will be noticed that the engines occupy a remarkably small amount of space, in fact, the engine-room is only about 40' long. The only auxiliaries are a Brons heavy oil motor of 7 B.H.P. driving a dynamo, a steam-driven dynamo, a steam-driven spare compressor, and the usual pumps.

Herein comes the great point of interest—all these auxiliaries obtain their steam from a donkey boiler of 120 lbs. pressure, which is fired by the exhaust gases from the main engine. Also the

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The Werkspoor engine is carried on forged steel columns and rigidity is secured by cross bracing.

exhaust gases are utilized for firing the deck boiler at 180 lbs. pressure for the steering-gear and winches.

However, at night, when the full electric lighting power is required, the deck boiler is oil-fired. As a point of interest, we may say that the little 7 H.P. auxiliary Diesel motor was running continuously during our two-hours' stay, but we did not see one of the staff go near it, showing the implicit confidence they have in its reliability.

One matter that surprised us all was that the engine-room was very dirty indeed, and did not look as if any attempt had been made to clean it since the ship arrived in port a few days previous.

The reason of this appearance was given us by Chief Engineer E. T. Grainger. The engine is of the open type, and when the light steel plate covers to the frame, or crank-pit, are removed, the oil is thrown out and carried about by the feet of the men. This oil is then made dirty by black smoke that leaks by the piston rings of several of the cylinders, about which I will refer to presently. Rather more oil is given to the working parts than is necessary. It appears that sight-feed-drip is used, and by rights the oil should just slowly drip from the feeds. But the tendency is for the engineers to make the oil flow rather than drip, so as to be on the safe side, their attitude being that any slight foreign element in the feeds might cause a stoppage of the flow with, perhaps, a hot bearing, thus they adjust and readjust the regulators until a regular stream is pouring on the bearings, and so save constant watching. However, it is obvious that closer attention could be paid to the lubricators with the result of greater oil economy and a cleaner engine-room, without undue risk of hot brasses.

Regarding the piston leakage, we would first say that this is not really important as it in no way affects the efficiency of the engine, but is merely annoying to the men in charge, and it can be eliminated. It appears that the "Emanuel Nobel" was completed towards the end of 1912, and was the first ship approaching her size that had been engined by the Werkspoor Co., so is to an extent experimental. From the first this little smoke trouble has been experienced with the engines, and in 2¼ years four new sets of different design of pistons have been fitted by the makers. The present ones were fitted about six months ago, and, although all twelve are exactly alike, five of them allow black smoke to pass by the rings, whilst seven of them give not the slightest trouble. However, on the return voyage to London the chief engineer firmly believes that this trouble will entirely be dispensed with.

Since this ship has been working many other

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little troubles have frequently occurred, which furnished the makers with most valuable experience. As each trouble has sprung up so has it been eliminated, and the later Werkspoor-engined craft have commenced their careers with all these points overcome. Every little mishap to these early boats is utilized to increase the reliability of later engines, which, while of the same general design, are modified in numerous minor details. Thus curiously enough the more mishaps in the past, the better it is for shipowners to-day.

At the same time it must not be thought that these little troubles prevent the "Emanuel Nobel" from carrying out her regular work. In fact, the only serious "hold ups" were when the propellers were being changed and during the first part of the war, when she was held up in Europe by war conditions and not for repairs.

Often, says the chief engineer, one engine is stopped for an hour for adjustments, etc., at sea, sometimes the other, but never both engines at once. When in port for several days, overhauling and repairs (when necessary) are carried out by the staff. Outside assistance is only called in when but a short stay is to be made in port at the same time that the motors require a good, but quick, overhaul.

However, the advantages of the Diesel engine are so great that all these sundry repairs seem to have little, or no effect, on the large profits that accrue through their adoption. Later Werkspoor-engined ships are giving splendid service. For instance, the "Selene" (2240 I.H.P.) has just completed a voyage of 14,600 miles from Port Arthur, Texas, to Singapore, without bunkering at an intermediate port, of which 9000 miles was a 44-days' non-stop run.

The previous, and maiden, voyage to this was a 22-days' non-stop run, after but four hours sea-trial, and three hours moored. Her engines were never turned-over in the shops as they were erected directly into the hull. This speaks volumes for the reliability of this particular design, also for the remarkable confidence displayed by the builders and owners. The latter, of course, had other Werkspoor ships already in service, which perhaps accounts for the confidence.

Another point upon which the chief engineer settled our doubts, and that was "propeller-racing," and he assured us that absolutely no trouble, or delay, had ever arisen from that cause. No attempt is made to throttle-down, as the Aspinals governor takes complete charge. With regard to the fuel used, we understand that a different oil is used almost every voyage. At times this is in order to ascertain as to which will give the best results. At the time of our visit the fuel supplied by the chartering firm was of 175 flash point and 0.865 density, but the engineer prefers a heavier oil.

A matter of vital interest is that the first cost of Werkspoor-Diesel machinery is not excessive as generally believed, the cost of two of these engines and compressors being less than $30 per I.H.P. compared with an average of over $40 per I.H.P. for American built steam engines and boilers.

Having detailed the working of this interesting motor-ship I will now describe at length the general design and construction of her main engines, as many points of the design are as noteworthy and quite unlike any other Diesel.

In first taking up the construction of high-powered marine Diesel engines, the Werkspoor Company had to consider, among other important features, what cycle they should adopt. It was open to them to take up the two-cycle design, of which they themselves and other makers at the time had had but very little experience, and reap the glory should they succeed in perfecting an ideal motor. On the other hand by adopting the four-cycle type they were practically sure of almost immediate commercial success, because the many years of building four-cycle Diesels for stationary work assured this.

After most careful consideration they decided to utilize their combined four-cycle land Diesel motor and marine steam engine knowledge. In this they showed good foresight (as afterward experience proved), because had they adopted the two-cycle principle they may have, or may not have, produced the reliable engine that they turn out to-day.

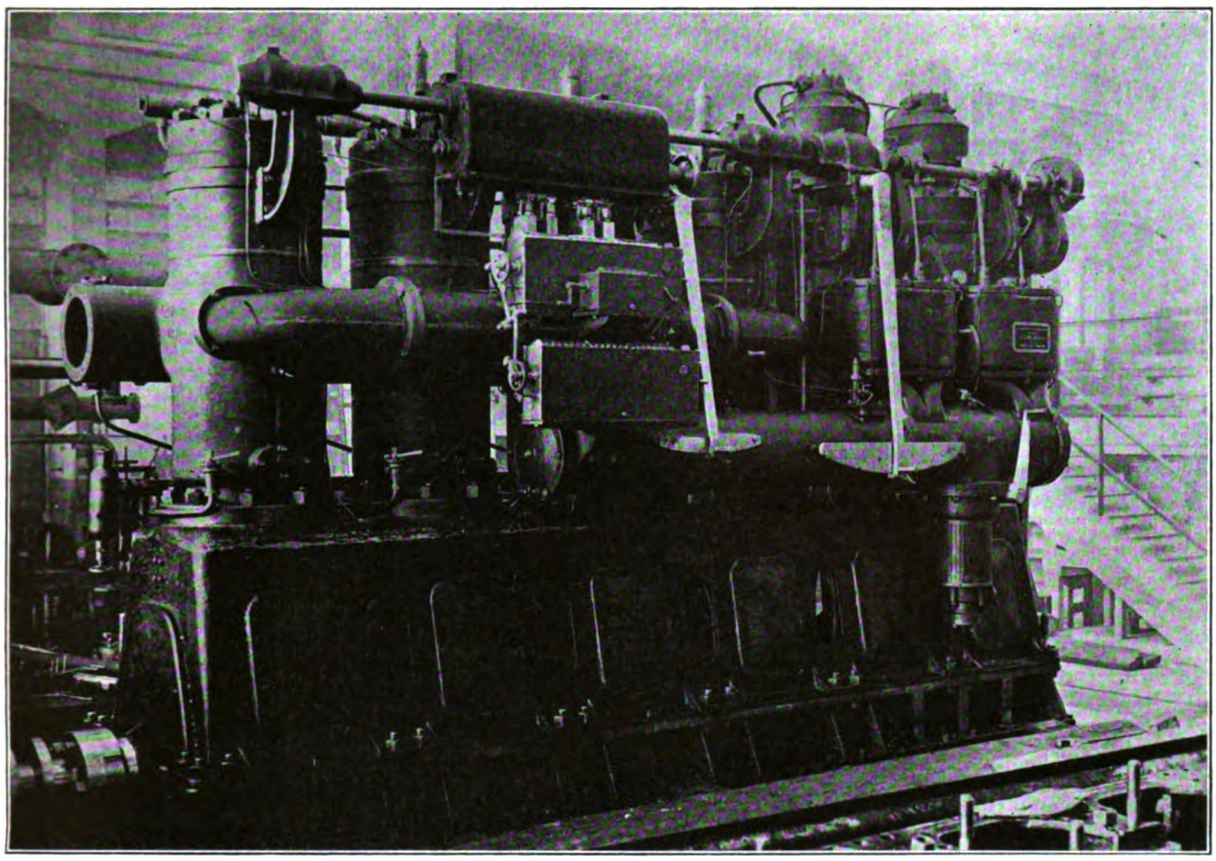
Another point which brought pressure upon their decision was that they desired to produce purely a mercantile engine, and it will be found that their motors turn at a slower speed than many other Diesels; at the same time, however, it is the lightest in weight of any but one. The latter feature is brought about, not by weight cutting, but by adopting an open type of design with the forged steel columns and cross stays in conjunction with cast-iron frames, and this composite system also affords additional strength, rigidity, accessibility and stress flexibility, so is along lines highly desired by marine engineers.

Turning to the "Emanuel Nobel's" engines it will be realized that a description of one applies to the other.

By reason of being of the long-stroke type, with short pistons, cross-heads and guides, the engine is of fairly good height, but by no means excessive, while the steel column construction makes it narrow; but the cross-stay affords rigidity, with the desirable amount of flexibility. The six working cylinders are divided into two sets of three, with the cam-shaft driving gear and all the control levers between.

One of the exclusive features of the Werkspoor design is to be found in the arrangement of the

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A two-cycle Polar Diesel, a decided contrast to the Werkspoor in appearance.

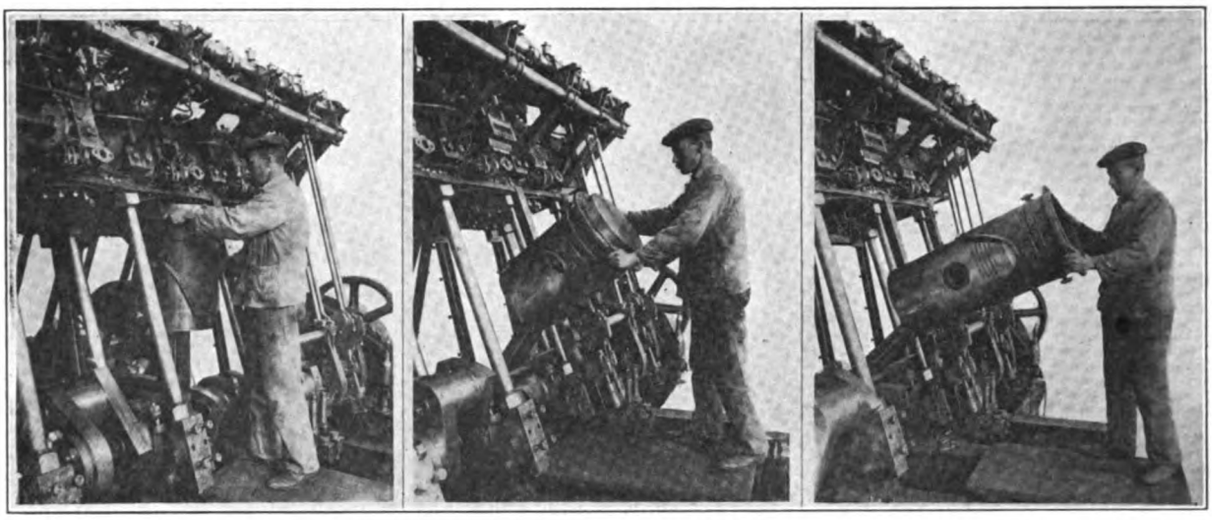
cam-shaft operating gear. At the back of the engine just over the bed-plate is a small lay crank shaft, operated by two to one reduction spur-gearing off the main crank shaft. On this lay-shaft there are four crank throws and the motion is directly transmitted to similar crank throws on the ahead cam-shaft (which is mounted in brackets on the cylinder head) by means of four long rods, and so the cam-shaft is given a gentle, even and continuous rotary motion, each throw being set at right angles to the others. These rods are of solid steel split down through the center and held apart by cross pieces, and this eliminates all vibration.

Now there are two cam-shafts, one for the ahead running and one for the astern movement, and the astern cam-shaft is driven by means of spur gearing from the ahead cam-shaft, while the two shafts are mounted on sliding brackets. When maneuvering, these brackets by sliding to and fro as desired, bring the ahead or astern cams under the rollers of the valve rockers, the rockers being eccentrically mounted in order to lift the rollers clear of the cams when shifting the cam-shafts. By making these rollers unusually large, the angle of the face of each roller where it meets its cam is never steep, and this produces smooth and silent running. Thus reversing is rapidly and quietly carried out. The engineers of the "Emanuel Nobel" reverse from full ahead to full astern in seven seconds, or start up from cold in three seconds.

In view of the fact that the four coupling rods would seem to require an arc for their lateral travel, unless they became buckled by the downward pressure, it is best to mention how the difficulty has been neatly overcome: the brasses are made with play, and clear the pins when the two shafts are in the center of the chord, i. e., the mid-gear position, coming back into contact when the shaft is in the running position for either ahead or astern motion.

Regarding the air-starting arrangements, it is interesting to note there are relief-valves fitted to the cylinders to reduce the compression internally; furthermore, there is a sleeve fitted to each air inlet pipe, so that the inlet can be closed and no atmospheric air admitted to the cylinders until the engine gets under motion. This sleeve is interlocked with the control gear. Thus this big engine can be started on a pressure of 250 lb. per square inch, which means great economy of compressed air, a very important point too often overlooked. The air-starting valve cam has a double "lift," one to allow of the valve being slightly opened, such as when the engine is hot, and does not require much air to get away under load. The larger "lift" can be brought into action should the engine be cold and refuse to pick up the load with a small quantity of air. To prevent sticking of the fuel valve there is a little automatic device, which closes it should it happen to remain open by any chance.

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Cylinder jackets and pistons are removable in a Werkspoor without dismantling the cylinder.

Most Diesel engines have a separate fuel pump to each cylinder, which is regulated by opening and closing the individual suction valves, and this method the Werkspoor firm consider unsuitable because it means very small pumps, which are most difficult to adjust, so they have fitted a single pump, which supplies two distributing boxes, each box having feeds to three cylinders, while every feed has its own adjuster. As a standby, an extra pump with a single change-over device is fitted.

Instead of pumping the oil to the distributers direct, it is fed to a reservoir, which is swung on a balance, and so the reservoir rises and falls when empty or short of fuel. This motion opens and closes a valve in the suction pipe of the fuel pump, and the amount of fuel supplied is thus regulated according to the requirements of the engine. From the reservoirs the oil runs to the distributers, about 7 feet below, and as the air pressure is introduced in the upper part of the reservoir, and also in the valve cages, the fuel flows by gravity alone, which has the advantage that the distributing valves have large apertures and so are easy to regulate. The receiver holds enough fuel to run the engine for 15 minutes. The distributing boxes are quite close to the indicator cocks so that adjustments may be made by the engineer in charge while he is reading the cards, so accurate setting should be obtained. To ensure reliability, the plunger fuel pump is made from a solid steel forging, the valves are simple steel balls, and the gland runs in an oil bath.

The cylinder proper is separate from the outer jacket, and is a simple casting. The supporting columns pass through the water jackets, and are carried right down through the crank-beds to the bed-plate, making a thoroughly marine job. Light steel removable plates enclose the crank-pit, etc., to prevent the oil splashing out.

An important part of the design is that the part of the cylinder liner that extends below the jacket may be unbolted, thus facilitating the easy removal of any piston without dismantling any portion of the engine. The time required to take out and replace a piston varies from 15 to 90 minutes according to the facilities. This could not be done with any other make of high-power Diesel, because it would be necessary to remove the valve gear and a cylinder head. The pistons are water-cooled, this being carried out by means of telescopic tubes.

Unlike the majority of Diesels, forced lubrication has not been adopted with the Werkspoor, the system used being entirely sight-drip-feed lubricators. To avoid over-lubrication, light steel plates are fitted in front of the connecting rods between the columns, to catch the splashes and direct them into the center sump of the crank-pit, whence the oil is pumped through a filter and cooler on the engine-room walls, from which it is returned by gravity to the numerous sight feeds.

Regarding the three-stage air compressor, which absorbs about 100 H. P., this is driven off the fifth cylinder by means of a link and beam lever on the crosshead at the back of the engine, and the water-cooling and bilge pumps are driven in a similar manner off the forward cylinders. The after cast-iron column is utilized as a cooler for the air compressors, the air circulating through water-cooled coils contained therein. A neat relief valve is fitted to the column to prevent damage should one of the coils burst, and at the top of the column there is a water overflow valve.

Thus it will be seen that the Werkspoor Diesel is self-contained and does not require a large amount of separate Diesel-driven auxiliary machinery to run the engine. Yet the engine of the "Juno," a single-screw ship tanker, with an engine of the same size and design as the two in "Emanuel Nobel," gave 1460 I.H.P. at 115

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R.P.M., or 1140 B.H.P. with a mechanical efficiency of 78 per cent., the M.E.P. being about 105 lbs. per square inch. Some of the cards have shown a M.E.P. of 126 lbs. per square inch.

The Werkspoor Company state that their testing motor has been running without any trouble, and for a considerable period, on Mexican oil of the following analysis:

Specific weight at 15 deg. C.....862 gravity
Flash point (closed test).....140 deg. F.
Calorific.....17430 B.T.U.
Sulphur.....4.6 per cent.
Asphaltum (approx.).....70 per cent.

This is an exceedingly heavy oil, in fact, we have never previously heard of a Diesel engine before successfully using oil with so much sulphur and asphaltum. However, we would add that the Werkspoor Company state that they could hardly guarantee that it may be used in the much more unfavorable conditions aboard a ship.

Emergency Generating Sets for Marine Service

THE prime requisite for emergency lighting and wireless service on shipboard is beyond question a reliable source of electric energy, isolated from and independent of the main power plant. The character of the equipment selected for this work is, however, of considerable economic importance. It will determine whether or not the service of the emergency outfit will be practically limited to those rare occasions when its use is imperative, or whether it can also be successfully applied in the ordinary daily power service of the ship, either as an effective auxiliary of the main source of electrical supply or, in certain cases, as the sole generator of electric energy for power, lighting and wireless operation.

Owing to the numerous applications of the internal combustion engine, with resulting improvements in design, performance and reliability, it has been possible to develop compact and highly efficient gasoline engine-driven generating sets especially adapted for marine service, which are relatively light in weight so that they can be safely and easily installed above the deep load line of a ship where they are effectively isolated from the main power units. At the same time, the two plants may, under normal conditions, be electrically interconnected; and the operation of motors, lights and wireless outfit may be secured either through the main or emergency generating sets or both.

There are manifold important advantages in such an arrangement, both from an operating and commercial viewpoint. In a ship already in commission, where the generator capacity of the engine-room is only sufficient to meet the ordinary demands for electric current, any excess that may be temporarily needed can be supplied by the emergency set, thereby avoiding the subjection of the main power plant to overloads and their potential dangers. Additions to the original electrical equipment of the ship may be made without augmenting the original power plant by a judicious selection of an emergency generating set of suitable capacity. With the ship in port, it is not necessary to keep part of the boilers and engine-room in operation in order to have electric service available.

For new ships of moderate size, the emergency generating sets may, in many cases, be made to take the place of the usual engine-room electrical equipment. If duplicate generators would ordinarily be installed, one generator could be replaced by the emergency set, thereby lowering the first cost of the power plant and yet retaining all the factors necessary for adequate electric service under both normal and emergency conditions.

In order successfully to meet operating requirements on board a ship, emergency generating sets have been provided with marine fittings throughout. The fuel supply may be located either above or below the engine; while the water circulation system is such that it can utilize either sea water with free discharge, or a closed circulating system with a storage tank. The latter affords better operation, however, due to the heating of the circulating water, which results in a more even cylinder temperature.

For the wireless outfit, the necessary alternating current can be obtained through a small, compact and self-contained motor generator set; and if storage batteries are also provided, a simple arrangement of switches and wiring will serve to interconnect or to isolate, as may be required, the three sources of current supply, the batteries, engine room and emergency generators.

The reliability of these emergency sets is such that their starting is practically instantaneous; and if held simply as reserves, the necessary periodical testing may be done without delay or difficulty, and without requiring the services of a skilled operator. The generator capacity selected for any ship will, of course, depend largely on the character of the work required and whether or not the output of the emergency set is to be used for other than wireless service and emergency lighting.

From an engineering standpoint, there is no reason for limiting the service rendered by gasoline engine-driven generating sets designed and built specially

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for marine service solely to emergencies, as their fuel economy and high thermal efficiency at full load is well maintained at partial loads. Overloads of short duration can, if necessary, be safely carried, although this type of prime mover should not under ordinary conditions be subjected to heavy overloading. If, in addition to the necessary periodical tests, the emergency sets are frequently used in connection with the ordinary electrical supply system of the ship, such use will give added assurance of their dependability in a crisis, an important consideration aside from the economies incidentally obtained.

Marine sets of this type are now available, ranging in capacities from 1 kw. to 25 kw. or even higher, designed especially for long continued and rigorous duty. The greatest possible factors of safety are conserved in all parts of both the engine and generator. The cylinders and valves are of such a size that the full rated output of the generator may be maintained without any possibility of overheating either. They operate quietly and can, therefore, be safely located near the wireless room. The amount of attention they require is practically negligible.

Gasoline engine-driven generating sets have attained their present high electrical and mechanical characteristics through successive developments, brought about by years of exhaustive experiment, supplemented by critical observation and analysis of their performance under the most severe and protracted operation. Their use on shipboard involves no problems which have not already been satisfactorily solved, and those installed on a number of ships now in commission have amply demonstrated in service their ability successfully to withstand the everyday working test.

SATISFACTORY DIESEL TESTS.

The McIntosh and Seymour Corporation has secured some very satisfactory results. The report of a series of tests on a 500 horse-power Diesel-type engine follows:

The engine was run at 165 revolutions and was of the four-cylinder type with cylinders 18⅞" in diameter and a stroke of 28.347 inches. Five tests were run on the same day as follows:

	1	2	3	4	5
Percentage of rated load	113.4	100.4	79.4	52.4	25.2
Revolutions per minute	171.0	165.0	172.0	174.0	170.0
Brake horse-power	567.0	502.0	397.0	262.0	126.0
Time of test in hrs.	½	1.0	1.0	½	½
Fuel consumption per B.H.P. lbs.	.405	.407	.412	.449	.652
Injection pressure, lbs.	925.0	925.0	815.0	785.0	775.0
Inlet temperature of cooling water	56.0	56.0	56.0	56.0	56.0
Outlet temperature of cooling water	145.0	147.0	145.0	147.0	150.0
Load	over-load	full	¾	½	¼

The fuel oil used was from the Indian Refining Company and of the following analysis:

Gravity at 60 degrees F.	.855
Beaume at 60 degrees F.	33.
Flash point	190. F.
Burning point	246. F.
Viscosity	1.67
Tar test	negative
Suspended matter	.005
Water	.051
Sulphur	.187
Chill point	25. F.
Distillation test naphtha	1.0
Lamp oil	50.1
Lubrication	6.0
Heavy lubrication	42.5
Carbonization	6.4
Acidity	trace
Heat value B.T.U. per lb.	19,288
Heat value B.T.U. per gal.	137,463

The technical success of the International Engineering Congress is now well assured. Notwithstanding the difficulties arising as a result of the present European war, the Committee on Papers is able to count on from 200 to 250 papers and reports covering all phases of engineering work and contributed by authors representing some 18 different countries. The Congress will therefore by truly international in scope and character, although the representation from the countries involved in the European war will naturally be less than originally planned.

The papers are now rapidly coming in and their character gives the fullest assurance that the proceedings will form a most important collection of engineering data and a broad and detailed review of the progress of engineering art during the past decade.

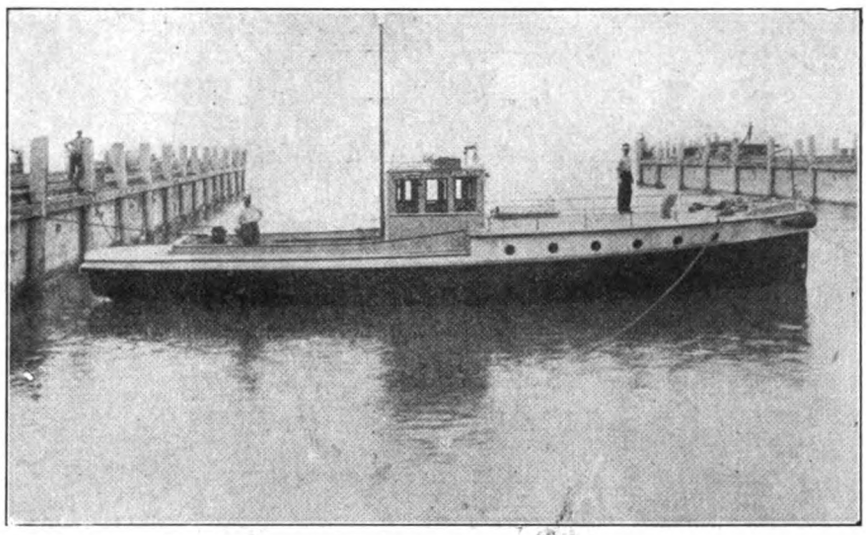
The Committee of Management is now issuing to all important engineering societies, in this country and abroad, invitations to appoint official delegates to attend the sessions of the Congress, and the presence of a considerable body of such delegates is well assured.

Membership in the Congress with the privilege of purchasing any or all of the volumes of the proceedings is open to all interested in engineering work.

The torpedo boat destroyer "Wadsworth," recently launched at Bath Iron Works, has a unique machinery installation for a U. S. naval craft. The "Wadsworth" is 315 feet in length, an oil burner and of 30 knots contract speed. Her main turbines will drive twin screws at 450 revolutions by means of spiral pinions and gears. The shaft horse-power will be 17,500.

The General Electric Company has been awarded the contract for installing the electric drive in the new battleship "California," whose keel is now being laid at the New York Navy Yard. The contract amounts to $431,000.

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A Fulton Diesel engined tug.

The Fulton Diesel

Few people, especially those on the East Coast, realize the tremendous number of commercial boats propelled by internal combustion engines of one kind or another that ply their business in western waters. One engine company alone in the past seven years has sold gasoline engines amounting in value to close on to $2,000,000. Another company in the past four years has sold over three hundred machines. It is estimated that over fifteen thousand work boats of one kind or another make their headquarters at Seattle alone. Here indeed is a tremendous field for the small powered engine that can stand up under the tests of durability and simplicity.

The fuel used by the great majority of the small engines in service on the coast is gasoline or distillate, but the advent of the internal combustion engine using heavy oil has made possible the commercial use of a fuel which ranges in price from slightly over two cents to four cents per gallon, depending, of course, on the distance from the source of supply. In small installations the steam engine has been largely replaced by either the gas engine, the Diesel engine or the semi-Diesel engine. Apart from the question of actual economy while under way, the supplanters of the steam engine were boosted quickly into favor by the fact that, unlike their older rival, they only consumed fuel while they were working and not when they were standing by. As to the choice between the three supplanters of the steam engine for small marine installations, this is nearly always an individual question. Each type has its distinct advantages and each type is represented by makes of engines that have proven themselves equal to the claims put forward by their manufacturers.

The Fulton engine, illustrated herewith, is of the pure Diesel type which secures a more complete combustion on account of higher compression and, being four cycle, has a low consumption of cylinder oil. It is interesting to note that with fuel oil at three cents a gallon it is cheaper to run a 50 horse-power Fulton than a Ford automobile. In other words, its makers, the Fulton Manufacturing Company of Erie, Pennsylvania, claim they can operate at a fuel cost of less than 1/5 of a cent per horse-power hour.

The accompanying cut is of a tugboat owned by the Maryland Steel Co., Baltimore, which is equipped with a three-cylinder 50 H. P. Fulton oil engine. The tug is 54 feet long, 10 feet beam, and has a speed of ten miles per hour. A similar engine is exhibited at the San Francisco Exposition, by the Fulton Manufacturing Company, in care of their agent, Henry C. Hyde Co., 143 Second street, San Francisco.

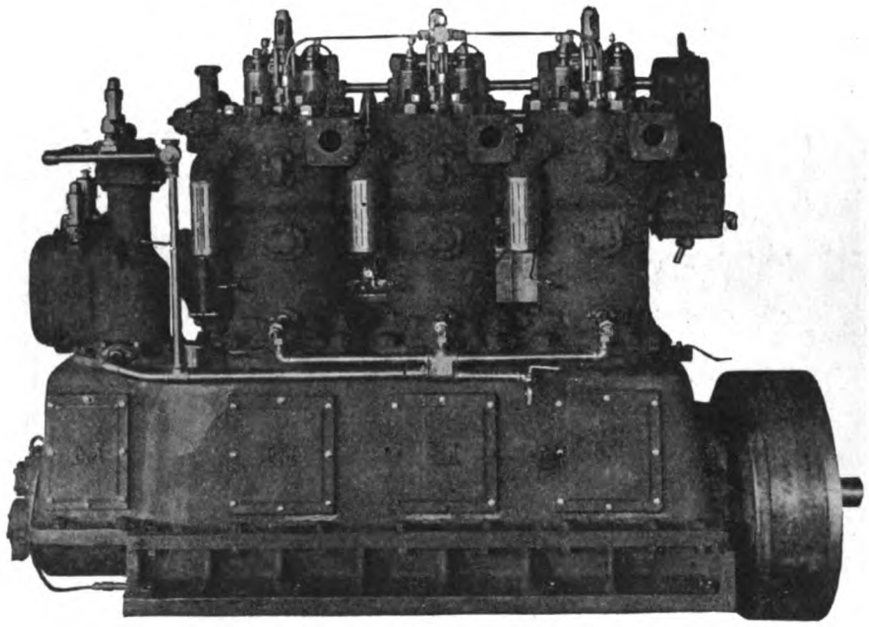
The last ship of the Thlinkett Packing Company, of Portland, the barge "General Fairchild," once a well-known American clipper ship, has been sold to James Griffiths and Sons of Seattle who, it is understood, will use her in the Alaska trade.

The Japanese Navy Salvage Company earned the $100,000 no cure no pay fee for salvaging the "Minnesota" in twelve days. This is considered a remarkable feat in case of dynamiting such a large vessel free from a reef.

The contract for the 150-ton floating crane for the Norfolk Navy Yard has been secured by the Wellman-Seaver-Morgan Company at $350,994.

At a double launching at Newport News on May 1, the new coast guard cutters "Ossipee" and "Tallapoosa" were put overboard.

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Engine of the tug pictured on the previous page.

BASIC PATENT OF THE TERRY STEAM TURBINE COMPANY SUSTAINED.

Judge George H. Bingham, in the United States Court for the District of Massachusetts at Boston, handed down a decision on March 13, 1915, sustaining the validity of Patent No. 741,385, owned by The Terry Steam Turbine Co. of Hartford, which has been involved in the suit entered about two and one-half years ago by them against the B. F. Sturtevant Co. of Hyde Park, Mass.

The suit alleged that the B. F. Sturtevant Co. was building a steam turbine which infringed this Terry patent.

In handing down this decision Judge Bingham said in part:

"The object in an impulse steam turbine, as in any other steam engine, is the transformation of the steam into mechanical power without loss of energy. This was accomplished in such a marked degree by Terry in a field where prior inventors, in endeavoring to accomplish the same purpose, had failed, that I find there was sufficient invention, in the means employed to bring about the result, to sustain the patent. I am also aided in reaching this conclusion from the position in the commercial world which the Terry turbine took immediately upon its being put upon the market, creating, as it did, a monopoly in the field to which it belonged, and maintaining the same for a period of about six years and down to the time the defendant's alleged infringing device was introduced.

"At the time of the institution of this proceeding, the defendant was manufacturing and putting upon the market a single wheel helical flow impulse turbine. . . . I find that this device infringes Claim I of the Terry patent.

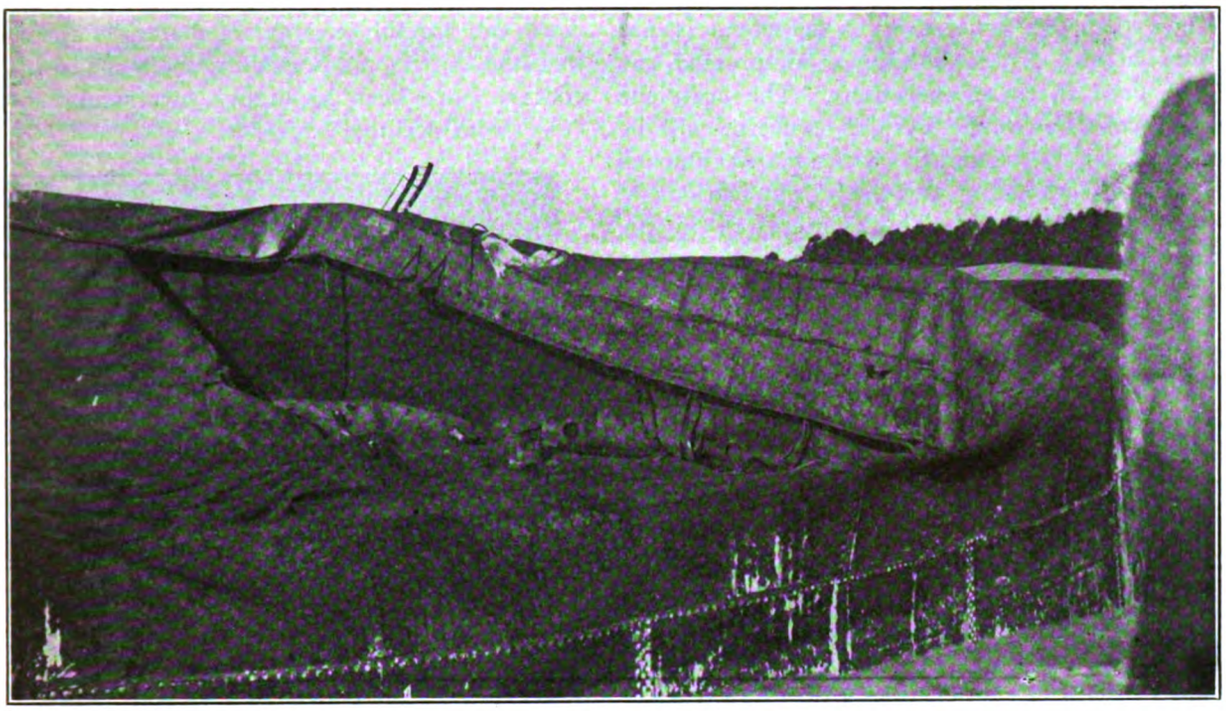
"As above stated, the defendant's first infringing device is of the same construction as that indicated in Fig. 2 of the Bentley patent, No. 944,839, except as to the crescent-shaped recesses and U-shaped openings. . . . The insertion of the plate between the chamber containing the nozzle and the chamber back of it produces a mere change in form. . . . That this is so appears from what Bentley (who is the engineer in charge of the defendant's turbine department) says in his patent No. 944,839, page 2. . . . I therefore find that this device also infringes claim 5 of the Terry patent.

"Three months after this suit was begun, the defendant ceased making use of the infringing device heretofore considered and adopted a modified construction such as is shown in Fig. 2 of United States Patent 1,042,871, granted to Bentley October 29, 1912, which patent is now owned by the defendant. . . . If the thickness of this plate was reduced between the space occupied by the nozzle and the receiving end, the arrangement of the nozzle and chamber would duplicate that of the Terry device. I find that it infringes both claims 1 and 5. . . ."

The Luckenbach Steamship Company is floating $500,000 of marine equipment bonds and it is of interest to note that Edgar F. Luckenbach is guaranteeing these bonds personally.

Charles D. Mosher, the well-known yacht designer, is now connected with the Talbot Boiler Company of New York.

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Wreck of an oil tank through fire. This mass of twisted plating was cut free with oxy-acetylene torches.

An Interesting Welding Job

THE Great Western Cutting and Welding Company recently completed what is probably the largest and most difficult job of welding of its kind ever undertaken on the Pacific Coast. The propeller of the steamer "John A. Hooper" had become badly corroded and twisted at the tips, but instead of having a new wheel cast, the offer of the Great Western Cutting and Welding Company to repair the old propeller was accepted. The wheel of the "Hooper" was of cast steel, 14′ 0″ in diameter, cast solid with four blades. The propeller was removed to a foundry where the corroded tips of the four blades were removed by the use of an oxy-acetylene cutting tool. The cuts were made, roughly speaking, on the five-foot radius of the wheel, or two feet from the blade tips. The thickness of metal at the point of cutting varied from 13/16″ at the entering and following edge to 2¼″ at the center blade, and the length of the cuts averaged forty-seven inches. The time consumed in cutting averaged twenty-five minutes to the tip. The best conditiond tip was patched up and used as a pattern and four new tip pieces were cast, the weight of these being about 300 pounds each.



Propeller of the "John A. Hooper."

The adjoining faces of the blades and the new tips were champfered and the weld was made by doing one side of the blade and then turning the wheel over and finishing the other side. The time occupied in this work averaged six hours to the weld, twelve hours to the blade and forty-eight hours to complete the job. Badly corroded spots on the original blade surfaces were filled in with metal so that the wheel has become virtually a new propeller. About eighty pounds of welding metal was used on the tip welding and approximately 5000 feet of oxygen and a similar amount of acetylene were consumed.

The Great Western Cutting and Welding Company has installed a highly interesting and instructive exhibit at the Panama-Pacific International Exposition. This exhibit is located in block number 10 of the Machinery Palace, and is comprehensive and complete. Cutting and welding operations will be carried on here daily, but owing to

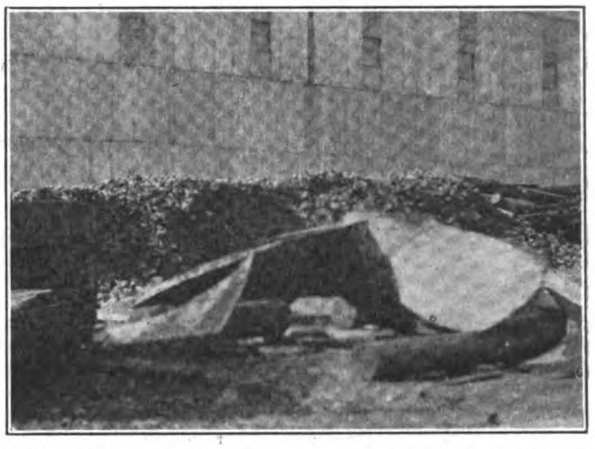
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the fact that the generation of acetylene is not allowed in any of the buildings, compressed gas will be used in these operations. The acetylene gas generator, as made by this concern, will be shown, however, together with many unusual examples of interesting and useful applications of oxy-acetylene welding. Those interested in the saving of time and money in cases where the cutting or welding of metals is advantageous should not fail to visit the booth of the Great Western Cutting and Welding Company. In certain special cases, such as the cutting of pipe holes in a finished bulkhead, a saving of as high as 75 per cent. may be effected.

One of the most spectacular pieces of work undertaken by the Great Western Cutting and Welding Company was the salvaging of a large gasoline storage tank of 55,000 barrels' capacity. The tank was 114 feet in diameter by 30 feet high. This tank caught fire and was burned out, the upper courses collapsing until the walls appeared as shown in the accompanying picture. Four men were cutting on this piece of work for eighteen days. Seventeen thousand ¾″ rivets were cut at the rate of four per minute. The three lower courses of the tank wall were saved and the floor was also reclaimed by welding over the holes caused by the falling of the structure overhead. In accomplishing this important piece of salvage work in which over sixty tons of structural material were saved from going to the scrap heap, 13,750 feet of oxygen and a similar amount of acetylene gas was used.

The welding and cutting torches of the Great Western Cutting and Welding Company have attained an enviable name for high efficiency and absolute safety. They are the only torches having a single control for both gases, they are so built as to eliminate the possibility of flare backs and the welding torch with its various nozzles will weld metals such as steel, cast iron, wrought iron, aluminum, brass or bronze from 3/32″ up to 2″ if the metal is cold, and if preheated up to 6″. The cutting torches can negotiate metal up to 8″ in thickness and leave smooth surfaces with the ductility of the metal unchanged.

The Great Western Cutting and Welding Company has been well known to the trade for many years, but it is only recently that the advantages of the oxy-acetylene methods of cutting and welding have been fully appreciated by marine engineers and shipbuilders. The manager of the concern, Mr. F. W. Clifford, has had many years of experience in the welding art and is thoroughly familiar with the limitations as well as the possibilities of all the leading methods of welding and cutting, and it is chiefly due to his patient research work and careful selection of materials and valves that the cutting and welding tools made by this concern have been so highly successful and hold "free from accident" records.



The tips of the propeller were removed and new ones welded on.

NEW STEAM LIGHTER LAUNCHED.

On March 10th, there was launched at the yard of Messrs. Verdon & Co. of West New Brighton, S. I., a new steam lighter designed by Messrs. Cox & Stevens, naval architects and marine engineers, for the Rock Plaster Manufacturing Co. of New York City.

This new lighter is an addition to the already large fleet of the Rock Plaster Co., and is to be used for general lighterage work in the limits of New York harbor in connection with carrying the product of this company, the design of the vessel having been carefully worked out by the architects to meet the requirements of the service in every detail.

The dimensions of the lighter are: Length over all, 97′; beam, 28′ 6″; depth of hold, 10′; draft, 9′ 6″.

The hull of the vessel is built of wood and is of unusually strong construction, all material and workmanship being of the highest grade.

As the cargo will be practically all carried on deck, the machinery has been kept as far aft as possible, and with the great beam and good freeboard, the lighter will be able to carry 175 tons without overloading.

The engine is 18″ in diameter by 24″ stroke, having been built by the Verdon Company, and the boiler is 9′ diameter by 13′ length, of the Heiperschausen leg type boiler of the most improved design.

The New London Ship and Engine Company of Groton, Connecticut, is busily engaged in enlarging its plant to take care of a heavy list of orders.

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Electric Arc Welding for Marine Work

THE necessity for making marine repairs rapidly, in order that vessels may not be out of commission too long, brings ship owners face to face with one of the most serious problems in connection with their business. Another factor which complicates this problem, and makes it a source of worry, lies in the expense incident to such repairs. It is to meet such a demand that electric arc welding outfits are being installed in large numbers in marine repair plants, shipyards, etc., and on docks of shipowners, and a little description of this system of making repairs will undoubtedly be of great interest to the readers of this paper.

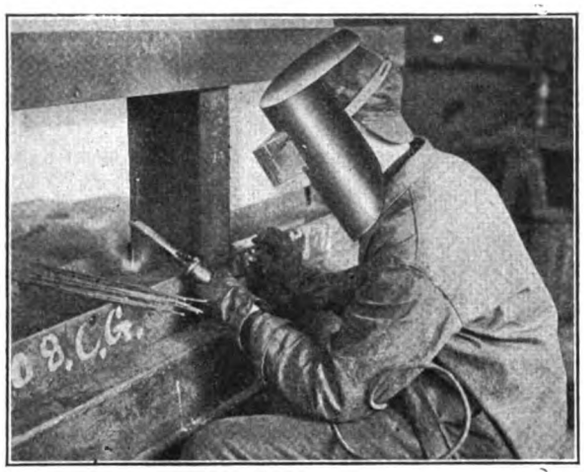


Fig. 1. Operator using metallic electrode. The electrode itself is melted and supplies the extra metal necessary for welding or building up.

One of the greatest advantages resulting from the use of electric arc welding lies in its extreme flexibility, as it may be used on sheets, tubes, castings or forgings of iron, steel, copper and various alloys of these metals. One of the most important applications, however, is for boiler repairs, as work of this kind can often be done without drawing the fires and nearly always without dismantling. The accompanying illustrations will show several marine repair jobs made with electric arc welding equipment and a typical outfit of this kind is also illustrated.

There are two methods of using the electric arc for welding and one for cutting, which are known as the Benardos and Slavianoff processes.

The Benardos process consists in drawing the arc between the piece worked upon and a single graphite electrode, using the heat of the arc to fuse suitable filling material into place, or to cut the piece by melting out a portion of it.

The Slavianoff process consists in using the work as one terminal of the arc and the piece of filling material as the other, the arc being drawn between the two and the filling in being done by the melting of the piece of filling material.

Owing to the peculiar action of the arc in the Slavianoff Process, the metal from the filling electrode is carried on to the work in a direct line and this makes it possible to work overhead, or on a vertical wall, as well as on a horizontal surface.

Apparatus for doing electric arc welding by both of the above processes is manufactured by the C. & C. Electric & Manufacturing Co. of Garwood, N. J., who are represented on the Pacific Coast by the Western Engineering Sales Co., who have offices in Seattle, San Francisco and Los Angeles.

The great advantage in having apparatus which can be used for practically all classes of marine repair work will undoubtedly be appreciated by all marine people, because this system of welding is applicable for boiler repairs, such as welding cracks, or building up plates which have been reduced in thickness by corrosion, welding broken frames, rudder posts, anchors, etc., welding broken crank shafts, broken propeller blades, and other articles of similar nature. It is also applicable for calking the plates of steel vessels, welding the frame work, calking the deck seams when made of steel plates, repairing broken rudders, engine frames, cranks, connecting rods, cylinders, and in fact for making all classes of repairs, as well as making joints in new construction.

This may seem like a very radical statement to those not familiar with the great advances made in electric arc welding apparatus by the C. & C. Company during the past ten years, but the fact that the U. S. Steamboat Inspection Service sanctions the use of electric arc welding for nearly all kinds of repair work, shows that the system is not experimental, but is thoroughly reliable.



Fig. 3. Ear of throat sheet welded; work done overhead with the metallic electrode.

The Government uses electric arc welders in several of its Navy Yards and at the Panama Canal, and such large shipbuilding concerns as Wm. Cramp & Sons, Harlan & Hollingsworth, Manitowoc Shipbuilding Co., Staten Island Shipbuilding Co., Newport News Shipbuilding & Drydock Co., and others; and such repair companies as Great

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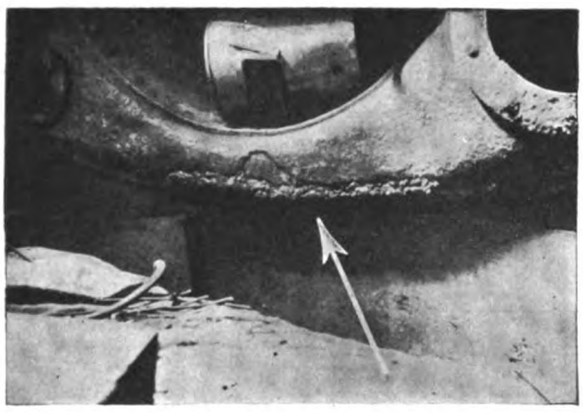


Fig. 5. Boiler of "Sarnia" after welding with metallic electrode.

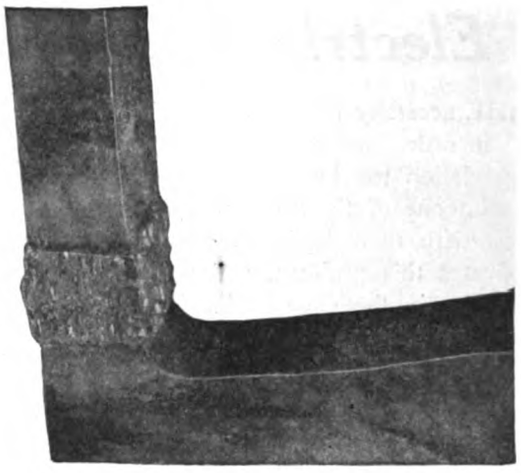


Fig. 4. 5" by 8" frame welded with metallic electrode.

Lakes Drydock & Dredging Co., Canadian Department of Marine and Fisheries, Algiers Iron Works, Joseph M. Clark & Co., Wm. E. Meyer & Co., and others, are all using electric arc welding outfits with the greatest of success.

When electric welding is properly done, the joints can be made as strong as the original piece, and even ordinary operators after comparatively limited experience have no trouble at all in making joints which are stronger than riveted joints.

Owing to the ability to reinforce the welding, if desired, the strength can be brought up to any point and, of course, badly corroded plates can be built up to their original thickness, or greater, very easily. This is especially important in its application to corrosion along the lower sides of marine boilers, and they can be built up again by overhead welding on the lower side of the boilers without removing them from position. All that is necessary is that there shall be space enough in which the operator can work and that he have the proper equipment for the purpose.

Work properly done by the Slavianoff Process will show high tensile strength and great ductility and freedom from blowholes, so that the joints are just as good as the rest of the sheet, and this work can be done very economically.

The cost of welding with the electric arc is less than by any other system, ranging from three-quarters down to one-tenth that of the gas systems, and the time required is also less.

This system is not limited to marine repair yards or shipbuilders, of course, as ship owners are also beginning to see the advantage of having an outfit of this kind on all of their more important docks and piers, and some of them and the Government are installing outfits directly on their vessels in order that repairs can be made while at sea and when in foreign ports. Equipments are also made in portable form so that the welding outfits can be carried to any convenient point for operation wherever current is available.

This system is also applicable to the cutting of scrap, as well as cutting materials for use in repair and construction work, and is just about as cheap as cutting with the oxy-acetylene system. It is not only used in boiler shops, but is also used in forge shops and foundries, and one of its important applications is the reclaiming of defective castings, as well as cutting off risers and gates. It is also applicable to annealing hard spots in castings and for raising the temperature for tempering purposes.

Cast iron can be welded so that it is just as soft as the original casting and consequently easily machined.

These equipments can be purchased for operation off any source of electric power and in various capacities for large or small work.

Owing to the low cost of operation and the consequent saving to ship owners, an equipment of this kind will soon pay for itself and be one of the most valuable assets, so it is only a matter of a short time until electric arc welding equipments will be as common as any other apparatus found in the marine field.

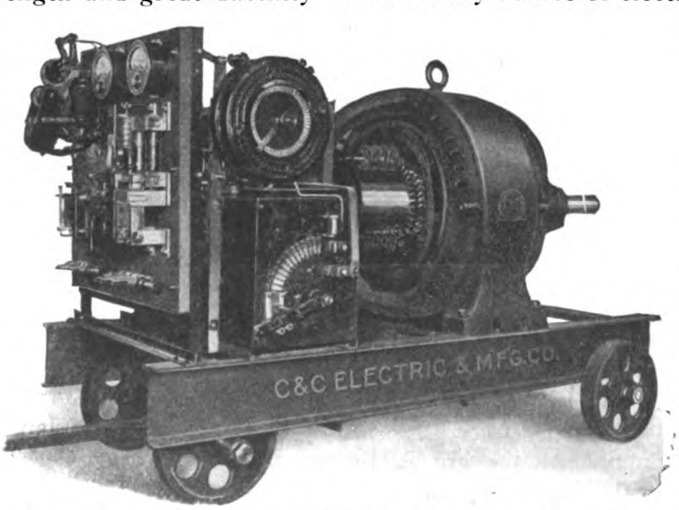


Fig. 2. Portable welding outfit for use in ship yards and on docks.

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Fig. 7. Cutting scrap with graphite electrode.

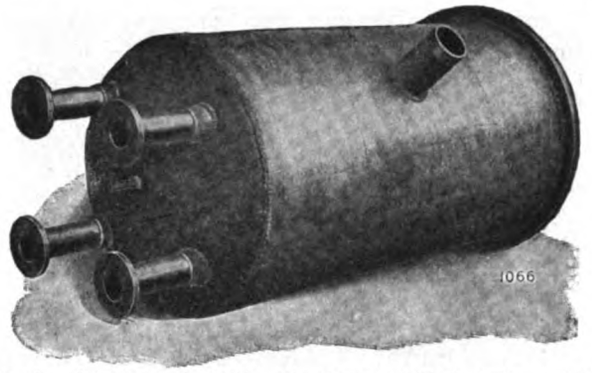


Fig. 6. Large tank with all seams welded with metallic electrode.

ELECTRIFICATION OF A DRY DOCK.

The electrification of the F. O. Smith Shipbuilding and Dry Dock Company's dry dock at Norfolk, Va., is a notable example of the saving that can be effected by the use of electricity in shipyards.

Previous to July, 1912, the dry dock was operated by old-fashioned steam-driven bucket pumps. With this equipment practically half a day was required to make a haul and occasionally trouble was experienced with the operating machinery. Being aware that with these defects the dock could not meet with great success the owners sought for means to improve the operation and shorten the time required to lift a vessel. As a result of investigation it was decided that electrically-driven pumps should replace the steam equipment. Accordingly, twelve 20-horsepower, 1,135 rpm. Westinghouse electric vertical motors coupled to 10-inch Morris centrifugal pumps were installed.

The installation met with such immediate success that in February, 1915, another section was added and six additional pumping units, duplicates of the ones previously installed, were purchased and placed in position.

It is now possible with this new equipment to lift a vessel high and dry in 17 minutes at an energy cost of about $4.50, whereas with the old equipment it required half a day and cost from $12.00 to $15.00.

The dock will accommodate anything afloat that is not over 260 feet long on the keel blocks or 3,000 tons deadweight, and will be the means of increasing the revenue at the port of Norfolk by thousands of dollars annually.

In addition to the electrically-driven pumps on the dock, the shipyard is fitted up with a very complete line of shipbuilding machinery, including air tools, modern machine boiler and blacksmith shops, the only marine railway in the world with a concrete foundation, a sawmill, and a Westinghouse electric welding outfit equipped also for cutting.

The illustrations show the schooner "James B. Drake," 231 feet over all length, 39.6 feet beam, deadweight 2,240 tons, in the dock. Fig. 1 shows the motors in operation with the covers removed. The motors are covered when not in use. Fig. 2 shows the dock in its final position. The auto starters controlling the motors are mounted in the house shown in the foreground.

Architects and engineers should include in their files a copy of the new and finely illustrated catalogue No. 10-F. description of the new Seabury Safety Water Tube Boilers for both stationary and marine service. This book describes the boilers in detail as to construction and operation. A large number of illustrations show stationary installations as well as vessels of Navy, commercial and pleasure types, in which Seabury motive power has been installed. These boilers are built by the Gas Engine & Power Co. and Charles L. Seabury & Co., Cons., of Morris Heights, New York City.

The Diesel-powered Sound steamer "Suquamish" of the Kitsap County Transportation Company appears to be fulfilling all that was required of her. This vessel has been the subject of much conjecture and many conflicting reports and those who are interested in the future of internal combustion engines on this Coast will be pleased to learn that she has been finally accepted by her owners and is now in regular operation, giving every satisfaction and showing remarkable fuel economy.

The Fore River Ship and Engine Building Corporation launched the torpedo-boat destroyer "Tucker" on May 4.

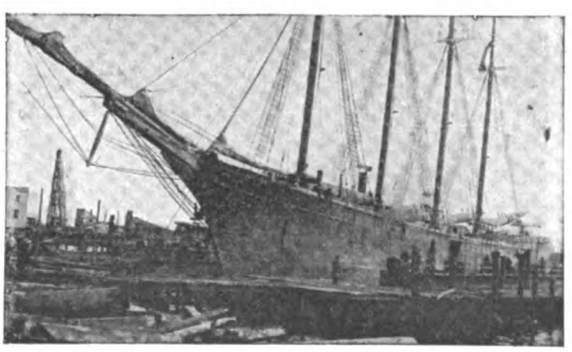


Fig. 1. Four-masted schooner in the F. O. Smith dock.

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The Pacific Coast Steamship Company's exhibit.

Marine Exhibits at the Exposition

TO the thousands of visitors who throng the huge palaces of the Panama-Pacific International Exposition each day, a liberal education is accorded on maritime affairs, because of the excellence of the judgment of the exhibitors who have done everything possible to illustrate the methods of water transportation.

The purpose of each of the steamship concerns participating in the big show has been to exhibit ships. Never before have so many models of vessels been assembled together. They total more than eighty within the Palace of Transportation, and others are scattered among the other palaces. All are interesting and range from the ancient war galley of the sixteenth century, installed by the Japanese Government, to the new and modern White Star liner "Britannic," the latter representing the last word in marine construction.

To grasp comprehensively the significance of the vast development made in the construction of ships, it is first necessary to visit the Japanese section in the Palace of Transportation. There is seen within its glass case an exact miniature duplicate of the galley used by the Koreans when they waged war against the Japanese in 1592. Next comes the model of the galley-yacht "Taiho Maru," which was built to the order of Lord Kumamoto more than three centuries ago. The original of this model sailed the inland sea and was used to demonstrate what was then known as a modern vessel.

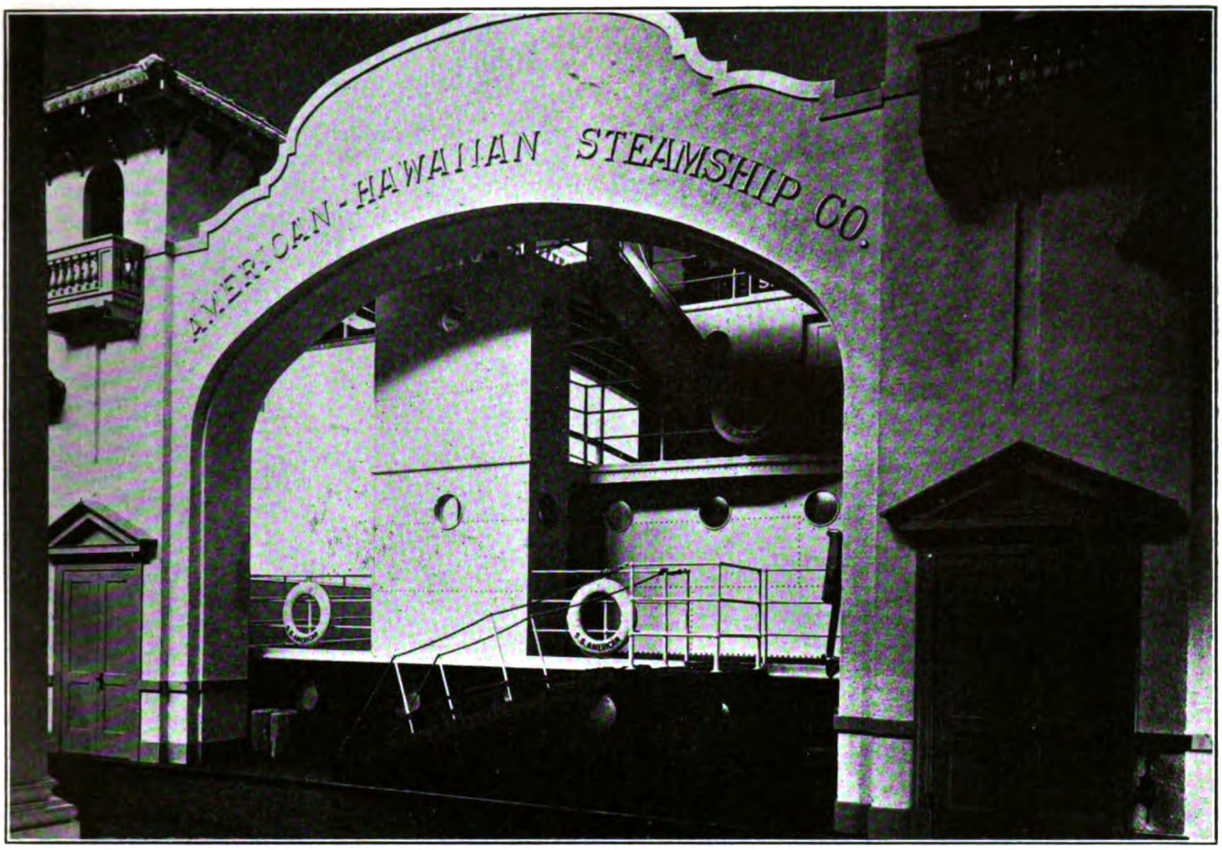
Another miniature craft in this exhibit is that of the war galley "Tanchi Maru." This is typical of the class of war craft used about 1630, and the power of propulsion consisted of thirty-eight sweeps on each side. In addition, a huge lateen sail was utilized to catch the fresh breezes off the Japanese coast. This class of galley has two decks and was popular with the feudal lords who roamed the seas to wage battle during times of strife and upon other occasions gave lavish entertainments beneath the ornate canopies spread over the upper deck. The smaller galleys were propelled by fewer sweeps.

A seven-foot model representing the modern battle cruiser "Harune," a 27,500-ton fighter, is perhaps the feature of the Japanese display. This vessel was built by the Kawaski Dockyard Company at Kobe. The model is of aluminum and is true to every detail. The same perfect detail of workmanship is found in the construction of the nine-foot replica of the steamship "Chiyo Maru," the original of which is used in the trade between San Francisco and the Orient, and operated by the Toyo Kisen Kaisha.

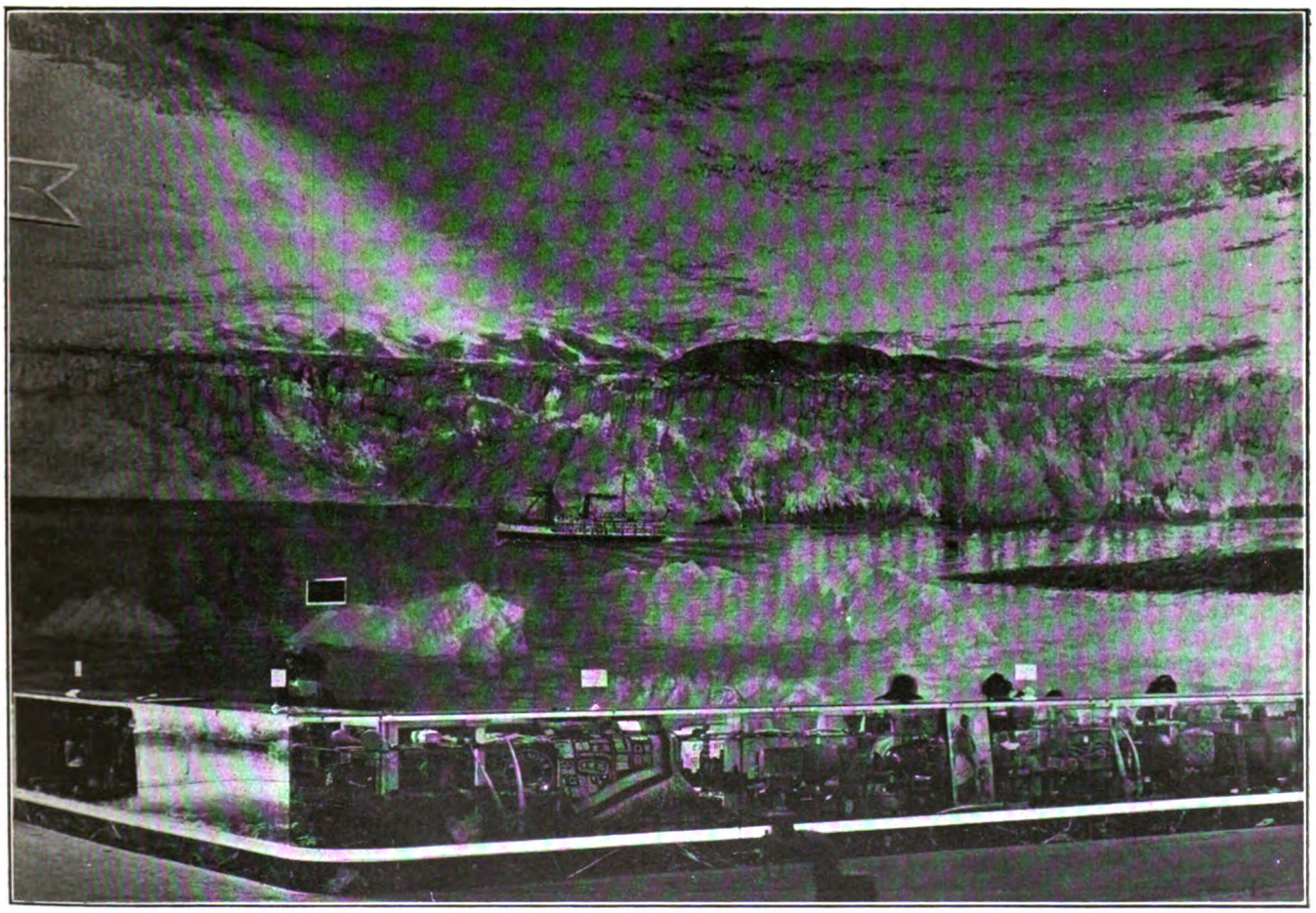
In point of workmanship, the model of the "Britannic" is representative of the most skilled perfection wrought by the mechanical artists of Europe. The model is twelve feet in length and the detail represents the original so faithfully that the winches and pulley blocks, although but a fraction of an inch in size, appear real enough to be used. The lifeboats and electric launching davits attract a deal of attention.

The model shows forty-eight boats, two being power launches. The davits with their electric control lift the boats from the racks. The racks contain six boats each. The apparatus is so arranged that if, through necessity, it is desirable to lower all of the boats from one side, this may be accomplished without difficulty. Every feature of the big liner is faithfully reproduced on a small scale, even to the arrangement which permits the use of lights, wireless

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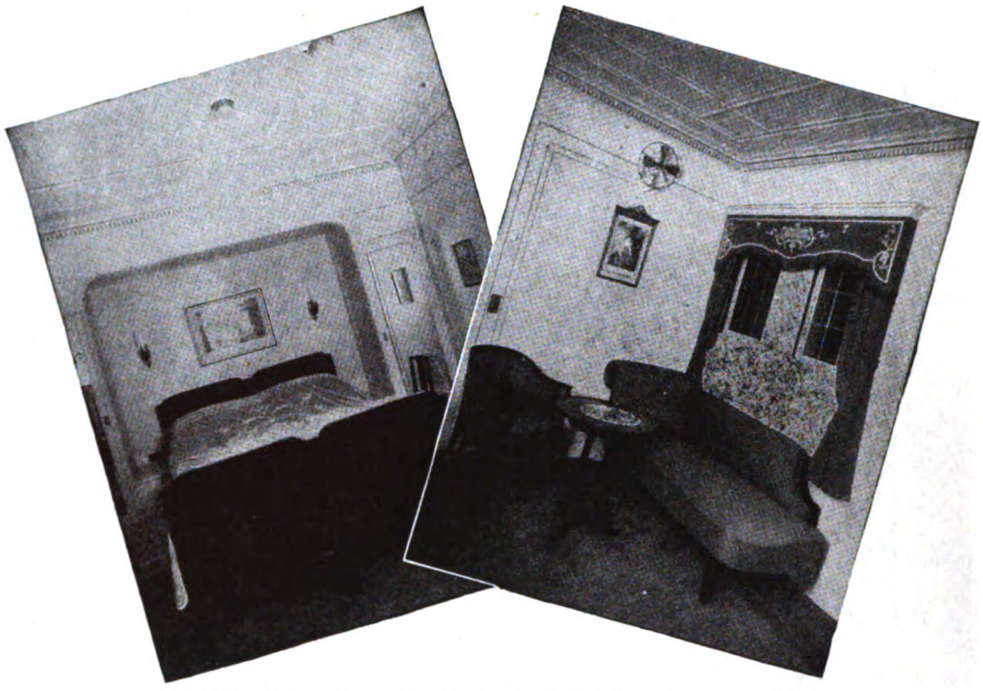


Entrance to the American-Hawaiian exhibit (Cardinell-Vincent).



The P. C. S. S. Company's exhibit is highly interesting to the traveler.

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Comfort on shipboard as shown by the Holland American line.

and the deck equipment after the engine rooms have been flooded with water and the main machinery rendered useless.

Other models of the White Star fleet which have been installed include the following: "Oceanic," "Teutonic," "Celtic," "Olympic" and the original "Britannic." The Red Star Line exhibits the original "Belgenland," the new addition to the fleet similarly christened, the "Westernland," "Kroonland," "Finland" and "St. Louis."

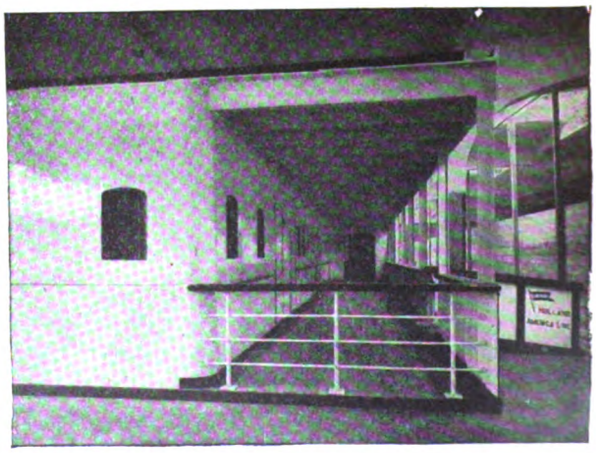
The representation of the original "Britannic" attracts the attention of thousands each day, and scarcely an hour passes without a comment being heard from some visitor who has at some period in his experience crossed the Atlantic in the one time popular vessel. The original ship's bell, mounted on solid oak and with a brass plate recounting the vessel's history, is also exhibited.

The Holland American Line has expended a considerable sum in the installation of an exact and full-sized replica of a section of the interior of the steamship "Statendam," the new liner now under construction at Belfast by Harland and Wolff. There is shown a first cabin suite, regular first cabin, third cabin, together with kitchen and dining room. When the visitor enters the ship section, he is to all intents and purposes on the big 45,000-ton ship, and all that is lacking is the faint vibration of the powerful turbine engines. The cabin suite is built in the Empire style with dark mahogany. The bedroom is in white enamel and gold panels in silk with carpets to match. The private bathroom adjoining is in white. Electric ceiling lights and wall brackets with portable lamps on the writing tables tend to prove to the visitor that life on board a big and luxurious liner is delightful—especially when traveling de luxe.

The full sized reproduction of a real liner attracts so many persons that the attendants are kept busy answering questions. The detailed workmanship is so perfect that but few persons are aware of the fact



On the inside,—luxury.



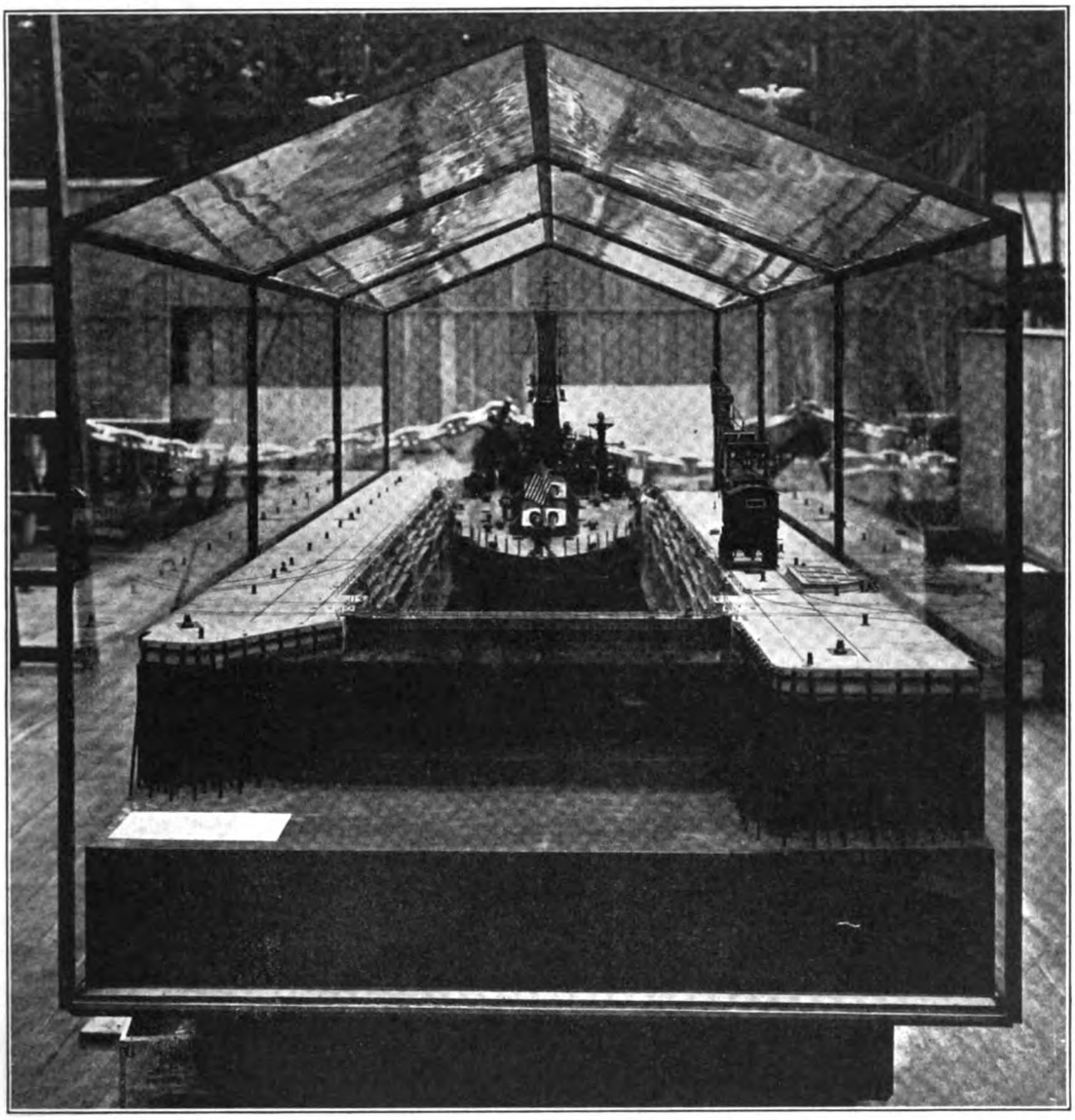
On the outside,—simplicity and airiness.

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that what appears to be heavy and massive steel, is not metal, but wood. By installing this exhibit, the Holland American Line is making it possible for thousands of persons who have never even seen a big liner, to understand at first hand the real conditions on board a vessel of this class.

The American Hawaiian Steamship Company, the big American concern which operates twenty-six steamships between ports of the Atlantic and the Pacific through the Panama Canal, has installed a duplicate section of the big freighter "American" employed by the company, is on hand and is prepared to answer all questions. The landlubbers are not slow to avail themselves of the opportunity and many leave the navigating bridge with a proud knowledge of nautical expressions in addition to a fair education concerning what's what on a vessel.

Looking down from the bridge of the "American," a huge map of the United States, Mexico and Central America, down to the Isthmus of Panama, is seen. The route of the steamers of the American Hawaiian Company between the Atlantic and the



Model of the New York Navy Yard dry dock.

within the Transportation Palace. The visitor steps on board the main deck of the ship, climbs to the boat deck, peers into the wheel-house and chart-room and then ascends to the bridge.

Everything pertaining to the navigation of the vessel is at hand, and as a reasonably high wall surrounds the exhibit and shuts off the view of the surroundings, it requires but little imagination for the stranger to believe himself to be on board a real ship. A quartermaster, chosen from the numerous ones

Pacific is shown, together wtih the names of the majority of the fleet. This exhibit is one of the arguments on display in favor of a larger and better American merchant marine, and this remark is frequently heard from the visitors.

The Pacific Coast Steamship Company has installed a novel display to attract attention to its service between Pacific Coast ports and also to Alaska. On one side is built a section of a steamer. This represents a parlor, bedroom and bathroom of one

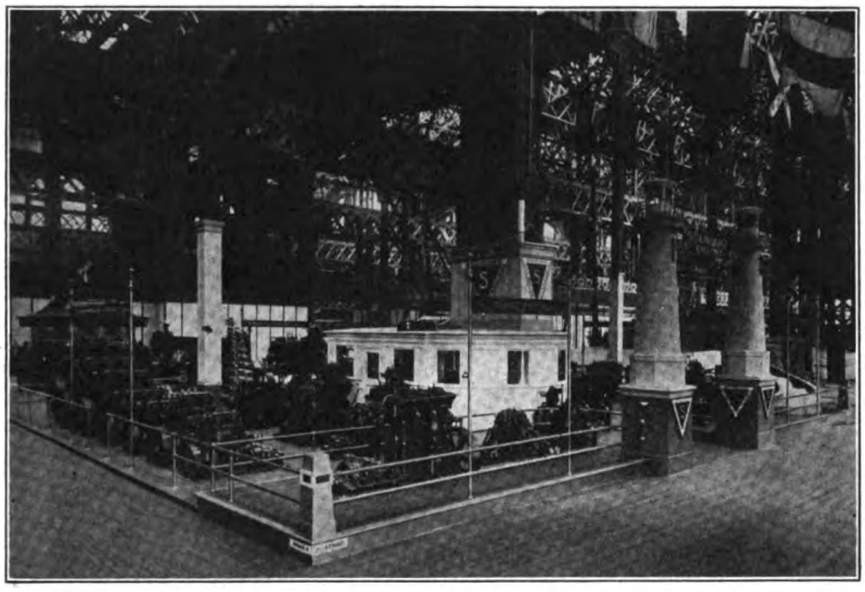
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of the suites of either the "President," "Governor" or "Congress." C. D. Dunann, passenger traffic manager of the company, has a well-equipped office, aft, and steamship and transportation visitors from all parts of the country or world congregate there and receive a welcome.

To the left of the steamship section, Dunann has installed the Alaska exhibit. A big panoramic painting of Taku glacier is in the background, and in the foreground is found a mass of wreckage and debris taken from the beach at Sitka, the historic old town, en route to Skagway. Two Indians are engaged in manufacturing totem poles, baskets and other curios, and competent lecturers are on hand prepared to tell all about the wonders of the Alaska trip.

The Alaska Steamship Company and several other steamship concerns have been busy installing their exhibits in the Transportation Palace and these have now been finished and graphically illustrate the routes over which the steamers of each line operate.

Within the walls of the Palace of Agriculture will be found more models of ships. The Union Steamship Company of Dunedin have placed within the New Zealand concession the models of four of their ships. They are the "Tahiti," "Maheno," "Tafua" and "Niagara." The latter is the last addition to the fleet to be placed in commission, and is now operating between Sydney, Honolulu and Vancouver. The "Tahiti" plies between Sydney and San Francisco.



Standard Gas Engine Company exhibit.

Another score of models depicting the art of the shipbuilder is located in the Palace of Machinery. This has been provided by the United States Government and has been moved from Washington during the exposition period. Here are shown the models of several of the cruisers, battleships, submarines, gunboats and also vessels in the service of the Coast Guard.

The attendant in charge of the latter exhibit is a veteran of the department which was until recently designated as the Revenue Cutter Service, and is kept busy throughout the day explaining the work of the department. Here is shown an interesting model of the ancient brigantine-cutter "Dobbin," which was one of the original vessels of the service more than one hundred years ago. Another is that of the derelict destroyer "Seneca," one of the modern coastguard craft. This vessel is shown as painted green, the color being used to notify all other vessels of the identity of the destroyer. Several models of the earlier type of cutters with side wheels are also shown.

The model of the historic cutter "Bear" is the most interesting in the collection. This is a perfect model in every detail and the unusual feature is that the miniature replica of the Arctic cruiser was built on board the "Bear" during its last cruise to the Far North. The workmanship was wrought by Seaman A. Rehmstrom, who labored during his spare time. When returned to civilization, the model excited the admiration of the entire department and it was decided to include it in the Government exhibit.

Upon the walls of the coastguard concession hangs a photographic reproduction of an official commission bearing the signature of George Washington. This is dated March 21, 1791, and appoints Hapley Yeaton of New Hampshire to the position of master in the Revenue Cutter Service.

The various bureaus of the Department of Commerce are represented in the Palace of Machinery by a splendid exhibit of the apparatus utilized by each. Lens of every description and for every possible use is on display. This includes an assortment of gas buoys, float lights, submarine signals, whistling buoys, day beacons and aids to navigation with which mariners are familiar.

Within the same building have been placed collections of life-saving apparatus and appliances which are used as safeguards to navigation. The Government exhibit is ample and complete. The feature, however, consists of the numerous models of vessels, a sample being at hand to represent every type of craft in existence.

The average visitor to the Exposition knows but little about ships and shipping. The majority come from the interior and in many instances have never seen a steamer. They are familiar with "photographs" and illustrations of ships, but have never

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investigated them at close range. To this class the marine exhibit constitutes a liberal education.

Among the engine exhibits at the Panama-Pacific Exposition, that of the Standard Gas Engine Company ranks very high in point of excellence of the machinery on display as well as in completeness. It is probable that no other exposition has ever had so many gas engines exhibited by one firm, for in the Standard's big space in the heart of the Palace of Machinery there are forty different sizes of engines on display, ranging from four to two hundred horse-power, and embracing stationary, marine, hoisting, electric and pumping sets. In the marine section of the exhibit, three of the engines are in operation and there are also three stationary engines running continuously. One of the stationary engines is driving an electric generator by means of a belt, another is directly connected to a dynamo, while the third operates a pump. The electric current generated is used about the exhibit for lighting effects and also for heating. A stationary seven horse-power engine operates a six-inch centrifugal pump by means of belt drive. The 900 gallons per minute delivered by the pump is used for display purposes in a miniature cascade. Of special interest are the five and ten horse-power special sets for marine lighting and pumping purposes. Engine parts and a complete line of the propellers manufactured by the company form an interesting part of the display, and a large number of drawings illustrate the numerous types of boats that are using Standard gas engines as motive power.

The Standard Gas Engine Company report that they are very busy at the present time and that the steady demand for their engines in the Orient, Australasia, etc., is a source of great satisfaction to this San Francisco enterprise.

The Fore River Shipbuilding Corporation has been awarded a contract for a molasses tank steamer, to be a duplicate of the "Nelson" built in 1912. She will be 370 feet by 52 feet by 27 feet in size.

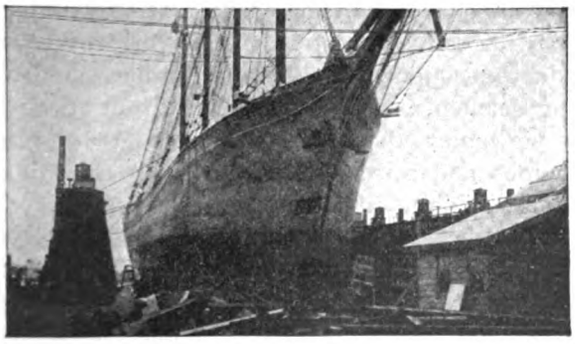


Fig. 2. The dock in its final position. See page 35.

It is a prevalent but mistaken impression, even amongst seafaring men, that the large and successful salvage companies maintain and use the powerful salvage steamers owned by them for the sole purpose of towing stranded vessels off the beach. Whilst these large salvage steamers are at times used in pulling upon a stranded vessel, such use is not the purpose for which they are maintained, nor is the successful work accomplished by these salvage companies to any appreciable extent due to the use of their steamers in pulling. The most effective and the important instruments used by the salvage companies in floating a stranded vessel are the anchors and cables, assisted by an intelligent use of the tides, swells and seas. The principle on which these salvage companies work is identical with that already outlined herein. The salvage steamers are maintained and used for various purposes, the most important of which is carrying the equipment and men to the wreck, assisting in placing the anchors and their subsequent recovery, assisting the stranded vessel when she is floated, and at times towing her into port.

When a salvage company uses one of their steamers to pull upon a stranded vessel, it is not done by using her as a towing vessel, but in the following manner, by which means the greatest effective pulling power is secured:

The salvage vessel is anchored out as far as possible in deep water in the direction that it is desired to pull upon the stranded ship. The anchor cables of the salvage steamer are then paid out and the vessel is manueuvered with her engines as near as desired to the stranded vessel until the towing hawsers have been passed and made fast between the two vessels. When this has been accomplished, identically the same method in obtaining the pulling power is used as with the anchors, viz: a heavy and continuous strain is put upon the towing hawser by use of the heaviest tackles available. The salvage vessel will also assist by putting a heavy strain on her anchors. The engines of the salvage vessels are seldom used at all and when used are run very slowly. By the above means a continuous and considerably more efficient pull is secured and with much less danger of breaking the towing hawser than would be possible by the salvage steamer using her engines.

Reference has already been made to the fact that a vessel stranded is seldom benefited by having other vessels attempt to pull her off the ground. In such cases as it is necessary or advisable to employ other vessels for this purpose, the greatest effective pulling power can be secured from them by pursuing the plan of operations used by the regular salvage companies.

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THE COST OF THE SEAMEN'S ACT.

NO BUSINESS legislation ever passed in the United States has caused more confusion in the industry affected than the Seamen's Act. The reason for this is not far to seek. On the Pacific Coast, where the labor unions controlling the three classes of help on shipboard, the sailor, the fireman and the steward, are securely intrenched, they and they alone have the power to apply the Seamen's Act to whatever altruistic or selfish end they see fit. On the Atlantic Coast, the act is intended to permit of the unions assuming a power which they have not hitherto enjoyed.

Just how far will the Seamen's Union take advantage of the powers given it under this new law? There are those who think this new act will not affect the coasting trade and if it does raise the cost of operating coastwise ships that the dear public will pay extra freight and passenger rates without grumbling. This is true to a certain extent, but just how far will the public go in the way of putting up extra freight and passenger money when this money adds nothing to the service, nothing to the safety and nothing to the despatch of either passengers or freight?

Will the unions let the steamship companies down easy, or will they hog everything in sight? The extra cost can be figured for either of these contingencies and the computer can then guess at what point between the two extremes his extra pay roll will strike. If we take one of the largest passenger carriers, the "Congress" of the Pacific Coast Steamship Company, we find that she carries fourteen boats and fourteen rafts. The new act provides that there shall be an able seaman or a licensed officer to take charge of each of these boats or rafts. In other words twenty-eight commanders for lifeboats and rafts are required. The nine licensed officers cut this figure down to nineteen, the vessel carries twelve sailors at present, so the new law would mean seven extra sailors. Now besides these there are required two certificated lifeboat men for each boat, or twenty-eight, and one certificated lifeboat man for each raft or fourteen, total of 42 certificated lifeboat men. Now we will suppose that the Seamen's Union is perfectly willing that the shipowner get his lifeboat men out of his steward and fireroom crews and that the Stewards and Firemen's Union have no objection to this arrangement. The members of these unions are gifted with ordinary common sense and are therefore not in the habit of giving something for nothing. If they let the shipowner off at $15 per month extra for a certificated man, why, the shipowner is lucky. We have then the wages and feeding of seven extra sailors or $560, the extra charge for forty-two certificated lifeboat men $630. A total extra monthly wage and subsistence account of $1190.

On the other hand, if the unions form an agreement that only the deck crew will take out certificates, this would mean seven extra sailors to complete the command of boats and rafts and forty-two extra sailors for certificated lifeboat men, or the wages and subsistence of forty-nine sailors, or $3920 per month. It will be advanced in contravention of the above that the Government will insist that the opportunity be taken by all classes of crew to secure certificates. This will not alter the added expense one iota. The Seamen's Act was specially designed to raise the crew's wages and it certainly is going to raise them as soon as it goes into effect. Will an uncertificated fireman work for $15 less per month than a certificated one? Certainly not, for if the ruling of his union will permit, he will promptly secure a certificate, demand and get his raise.

The proponents of the Seamen's Act claim that in its application to foreign shipping it will result in the equalization of the wage schedule for all ships calling at American ports, that it will raise the pay of sailors practically the world over and that in consequence of this raise higher standards among seamen will be the result. From an altruistic viewpoint then, the Seamen's Act creates more jobs and raises wages, improves conditions, lessens discipline and will do this for half the sailors in the world, provided it can be made to stick. It is right here, however, that we run against a snag. We cannot legislate for a foreign ship and hold that ship to obey our legislation nor can we force any European country to agree to our

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dictation in matters pertaining to the merchant marine. What is to prevent a French, German, English or Norwegian ship that has had an American waged crew forced upon her captain at San Francisco, for instance, from discharging the entire crew at his first home port and paying them off at the wages of that port and not at the wages at which they were shipped? There will be no treaty stipulations obliging foreign countries to respect the conditions under which a crew were shipped at an American port as foreign courts would uphold a captain in his plea that the high priced crew were shipped through force and coercion and therefore the contracts made with them were invalid.

The effect on trade following a rigid enforcement of the provisions of the Seamen's Act by the Sailors' Union would be quite marked. Ships will continue to come to American ports for freight and passengers no matter what conditions they are forced to put up with, but, nevertheless, there will be a big falling off in the number of ships that come. The regular foreign lines will see to it that we pay dearly for any inconvenience we cause them, while the tramp will pass us up altogether provided she sees the slightest opening elsewhere. Canadian ports will benefit greatly through transshipment of American goods, both export and import. Manila will lose her chance to benefit by the present embarassment of Hong Kong and the Oriental trade with America will prove a fruitful field for the advancement of Japanese power, both military and mercantile.

The cost, then, of the Seamen's Act, on the assumption that the unions will take full advantage of the opportunities presented to them by its provisions, will be a heavy increase in coastwise freight and passenger rates to meet added operating expenses and the practical elimination of the American ship from even the slight participation she now has in the world's carrying trade.

PILOTAGE REDUCED.

On April 27 the Governor of California affixed his signature to the Flint bill, reducing the pilotage charges at the port of San Francisco from $3.00 per foot draft and 3 cents per registered ton, to $2.00 per foot draft and 2 cents per registered ton, a reduction of thirty-three and one-third per cent. in the present rate. The new order of things goes into effect on August 27 and marks the close of a long campaign to secure more attractive port charges. The Pacific Marine Review fought persistently for twelve months to secure a reduction in the pilotage, and at last our efforts have been crowned with success. It is with no small pride that we contemplate the results of our efforts. Aside from the advantages accruing to the port of San Francisco and to individual owners through the reduction of pilotage, there is also a valuable object lesson to the shipping interests in the fact that such a victory for the port was possible. Our part in this matter was largely that of a medium through which a sentiment could be expressed, and as long as such a channel exists and as long as the shipping interests stand fairly shoulder to shoulder and use such channels of expression to further measures that are both helpful and just, many conditions that hamper the proper growth and development of our maritime interests may be ameliorated if not altogether removed. There were many who believed that a reduction in pilotage for this port was an impossible dream, but hard fighting, coupled with the fact that the Bar Pilots' Association is composed of broad-gauge men made the victory of April possible.

A MATTER OF VIEWPOINT.

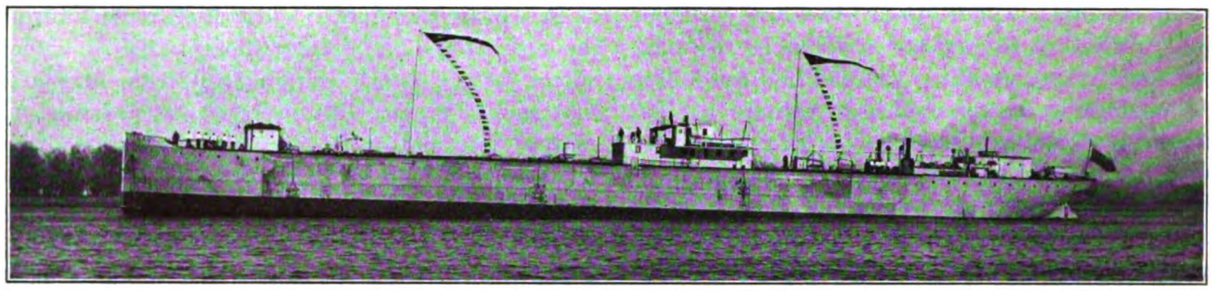
Representative Hardy, who hails from the great Lone Star State, has this to say in regard to the American steamship owner:

"I have no doubt the shipowners object to every requirement that provides for efficiency. They would like to be allowed to man their vessels with wholly inexperienced crews when they wished."

Judging from the hearings on the Seamen's bill held before the House Committee on Merchant Marine and Fisheries, the above quotation voices the views of a goodly number of Congressmen. We will probably learn next that upon receiving a wireless that his ship is in distress and will probably be lost with all on board that the American shipowner invites all of his friends out to a wine dinner to celebrate the welcome news. The business of a ship is, if possible, to make money for her owners and we have always been taught to believe that the well-found and well-manned ship is the only one that can make money in these days of strenuous competition. According to Representative Hardy, however, the records of steamship companies for the past seventy years are all wrong and the only way to make money is to employ inefficient crews and put them to sea in old tubs. We are afraid the honorable gentleman from Texas is not very well up in the steamship business.

"The Seamen's Act with its vexatious and unprecedented demands on foreign shipowners is a foolish bid for diplomatic friction and trade reprisals. In the present state of international relations it is a piece of stupid bravado."—New York Tribune.

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Shipping Notes

The merchant marine of Denmark has been growing rapidly lately, largely due to the heavy increases in the fleets of the East Asiatic Company and other large owners. During 1914 there were 145 ships cleared from Danish ports bound for the United States, and of these 89 were Danish, 20 Russian, 16 Norwegian, 9 German, 7 Swedish, 3 American and 1 British.

The shipping returns for Hongkong, the great meeting point of the East, show the following interesting results for 1914. The Japanese, Norwegian and Danish tonnage show an increase over 1913, while British, German, Austrian, Chinese, Dutch, French, Italian, Portuguese, Russian, Swedish and American tonnage all show a falling off. Despite the falling off, 12 ships arrived at Hongkong every day, and on an average six of these were British.

The "Arabis," built on the Tyne to the order of the Flower Motor Ship Company, is the latest motor ship to go into commission. The vessel carries 7000 tons deadweight. The engine room force on this ship includes seven engineers, two donkeymen and three greasers and wipers.

The Argentine battleship "Moreno," recently completed at the yards of the New York Shipbuilding Company, Camden, New Jersey, will represent the Argentine at the Panama-Pacific Exposition and is expected to start shortly on a leisurely trip through the canal.

The Imperial Oil Company, owners of extensive oil lands in Peru, has installed a refinery at Ioca, on Burrard Inlet, a few miles from Vancouver. The site covers 87 acres and the plant cost $1,250,000. There are 50 tanks, one of which is of 3,000,000 gallons capacity. Three oil tankers can berth simultaneously at the company's dock, where there is a minimum depth of water of 30 feet. The crude oil is discharged from the ships and pumped to the tanks through a 12″ pipe line by electrically operated pumps of large capacity.

The steamer "Atlantic" of the Emery Line, which made several trips to this Coast, was recently sold for service in the trans-Atlantic trade, the price paid being, it is said, $640,000.

Burmeister and Wain's latest output in the motor ship line, the "Panama," is a sister ship to the "Tongking" and "Malakka," having the following general dimensions: Length between perpendiculars 410′ 0″, beam 55′ 0″, depth, moulded 30′ 6″, and deadweight capacity 9200 tons. The two main Diesel engines develop 3100 horsepower. The fuel consumption on trial, including the consumption for the auxiliary Diesel engines, pumps, steering gear, etc., was 494.8 kgs. per hour of ordinary Borneo crude oil, or .146 kgs. per horsepower hour.

The United States Coast and Geodetic Survey Service has purchased the twin screw steam yacht "Isis" to take the place of the survey ship "Endeavor." The "Isis" is a twin screw yacht built in 1902 at Newburg, New York, and is of the following dimensions: length 180′ 4″, beam 24′ 8″, depth 13′ 5″. She is powered with two 3-cylinder triple expansion engines 12-18½-29 by 30 inches, and steam is supplied by two water tube boilers. The price paid for this craft was in the neighborhood of $60,000.

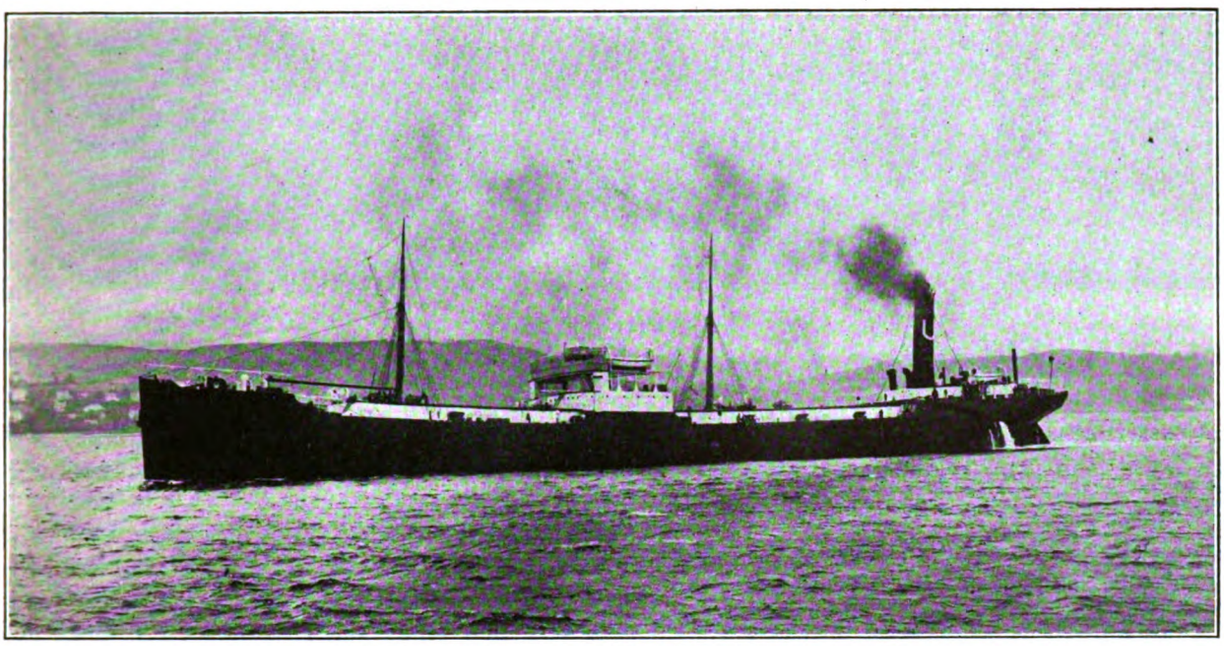
The Texas Company has ordered two oil tankers from the Fore River Shipbuilding Corporation. The delivery called for is ten months and the price $750,000 each. Their cargo capacity will be 8000 tons, speed 11½ knots, length between perpendiculars 415′ 0″, beam 56′ 0″, moulded depth to upper deck 32′ 9″.

It is reported that the Harlan and Hollingsworth Corporation has closed a contract for two tankers. One of these is a sister ship to two previous tankers for the Anglo-Saxon Petroleum Company, 449 by 52 by 26 feet, and the other is a 400-foot tanker the names of whose owners have not been given out.

The American claim against Germany for sinking the "William P. Frye" is $228,300. The value of the vessel itself is placed at $150,000, or $45 per ton, which is a fair enough valuation for a sailing ship built in 1901.

It is understood that the three 8500 ton deadweight colliers now building for the Coastwise Transportation Company at the New York Shipbuilding Company yard have been fixed for a long time charter to

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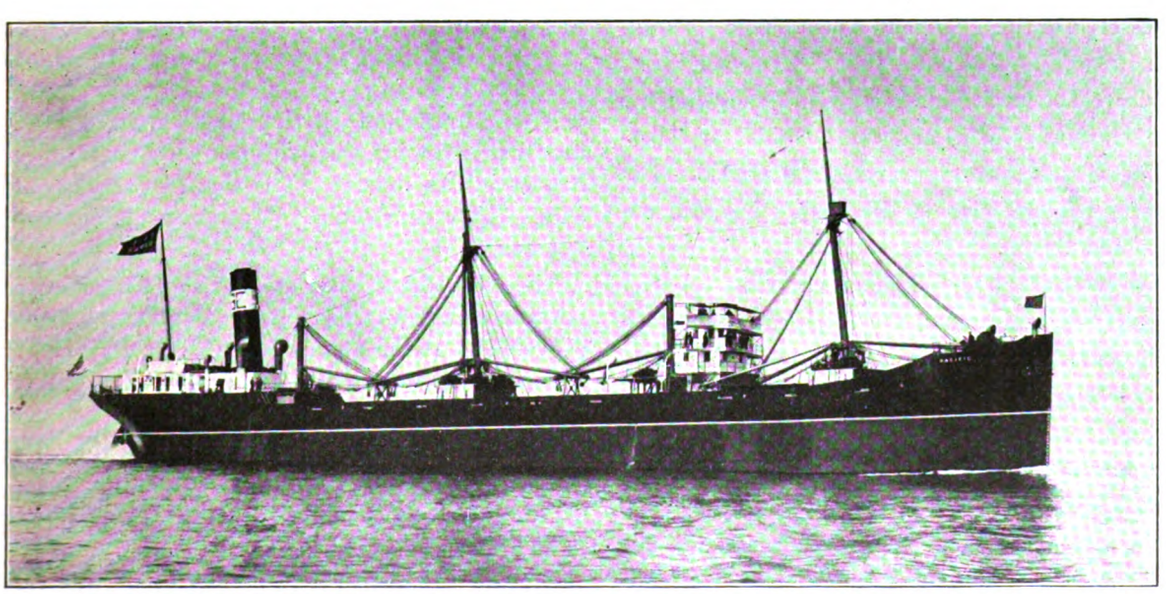
Union Oil Company tanker "Lompoc."

the Consolidated Coal Company of Baltimore for carrying coal to Mediterranean ports.

It would appear that the actual earnings of the Panama Canal closely approximate the operating and maintenance charges. Indeed there is every reason to believe that there will be something of a surplus after the first twelve months to apply on the great interest charge.

For supplying the canneries and fishing fleets of the San Juan Islands, the Standard Oil Company is now establishing a distributing station at Friday harbor. A 50-000-gallon tank was towed to the new station from Seattle.

With the arrival of the steamer "Bravo" last month was inaugurated a new line. This vessel is one of a large fleet of steamers and motor ships operated by Fred Olsen and Company of Christiania, one of the largest ship-owning firms in Norway or Sweden. The new service will be started with steam vessels, but it is expected that when the six fine motor ships now on the ways for this concern are delivered that the service to this coast will be taken care of by these vessels, whose fuel economy is particularly attractive on such long voyages. The new Olsen motor ships are being built by Burmeister and Wain and three of them will be of 10,000 tons deadweight capacity and the other three of 6,000 tons capacity. G. W. McNear, Inc., will act as local agents for this important new service.



The "Pacific." The Emery Line has sold the sister ship of this vessel, the "Atlantic," for use in the transatlantic trade.

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Pacific Coast Shipping Notes

Work of construction of the lighthouse and fog station to be built at Cape St. Elias, Alaska, probably the most important aid to navigation asked by the Seattle steamship companies operating in northern waters, began May 1, according to the Department of Commerce at Washington, D. C. The lighthouse and station is provided for in the $500,000 appropriation made by Congress for aids to navigation in the north.

The Cape St. Elias lighthouse and station will be located on the south end of Kayak Island. It will be built on a shelf 52 feet above sea level. The plans call for a square tower supporting a cast iron watchroom and a second order lantern with its focal plane forty feet above the base of the structure and ninety feet above sea level. A big fog signal will also be installed.

Five schooners making up the fleet of the bankrupt Globe Navigation Company were sold at public auction at Seattle recently by the trustee in bankruptcy for $90,000 to a committee representing the stockholders of the company.

The vessels are the "William Nottingham," "Alexander T. Brown," "Willis A. Holden," "J. W. Clise" and "Wilbert L. Smith," the first four being laid up in Eagle Harbor, Wash., and the "Smith" at Aberdeen. The vessels were appraised at $140,000. The new owners will not charter the vessels but will endeavor to sell them.

The five vessels have a lumber carrying capacity of 5,200,000 feet and among the throng that crowded the courtroom there were many who were evidently desirous of obtaining immediate charters for lumber shipments.

The value of Seattle's exports and imports last month was $14,892,000 as compared with $8,712,000 for April, 1914. Siberian commerce made an important showing. The largest increase was in domestic imports, which rose from $2,783,000 to $5,295,000.

Twenty-seven fish boats with a total value of $135,000 have been launched in Tacoma since January 1. About twenty more will be launched before the beginning of the salmon season in June.

The fishing steamer "Starr" of the San Juan Fishing & Packing Company is now on the dry dock at the plant of the Seattle Construction & Dry Dock Company for cleaning and painting. The vessel is being equipped with a Kilbourne & Clarke wireless set under the direction of C. B. Cooper, radio superintendent of the Kilbourne & Clarke Company.

The big freighter "Seward" of the Alaska Steamship Company has been on the dry dock at the plant of the Seattle Construction & Dry Dock Company for cleaning and painting preparatory to returning to service after lying idle in the East Waterway.

On April 24th, at San Francisco, occurred the death of Captain Thomas Riley, a well-known coast skipper. Captain Riley was born in England in 1861, served his apprenticeship on an English vessel. Between 1887 and 1897 he was in the employ of the Pacific Mail, rising from boatswain to captain. In 1897 he joined the Pacific Coast Steamship Company's forces, his first work being the bringing of the "Cottage City" to the Coast. In 1904 Captain Riley was running the blockade to Siberia during the Japanese-Russian war and was captured and detained in Japan for several months. Among the well-known boats on which he served as master were the "Montara," "Umatilla," "City of Puebla," "Tampico," "Senator" and "Queen."

The steamship "Kingston" of the Kingston Transportation Company has just undergone extensive improvements at the plant of the Elliott Bay Dry Dock Company, including the equipment of a galley and a dining-room.

General Manager Ringwood, of the Pacific-Alaska Navigation Company, spent the early part of May in San Francisco looking over his company's affairs.

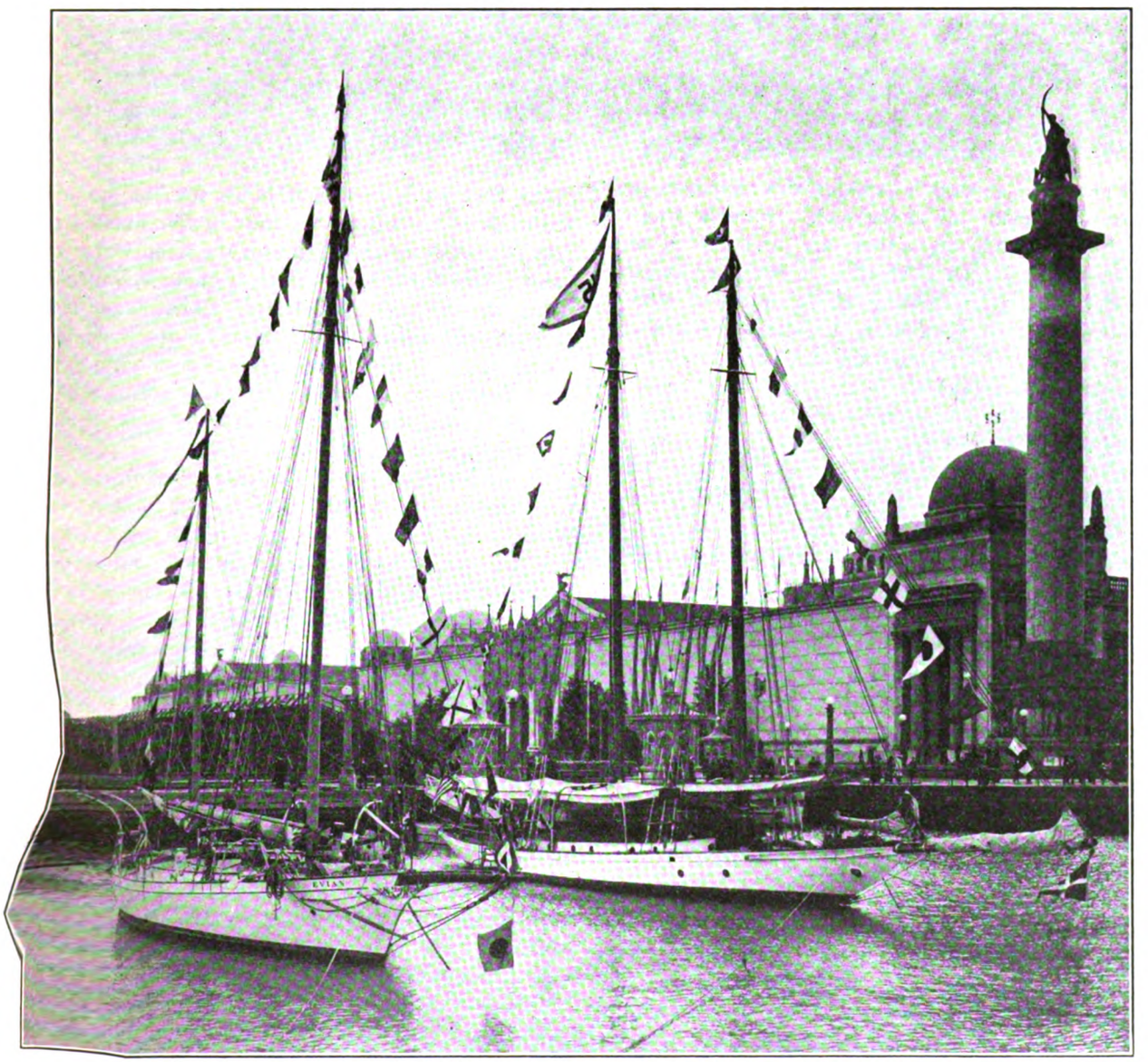
Grace & Company's freighter "Cuzco" was recently on dry dock at the plant of the Seattle Construction & Dry Dock Company for overhauling and painting.

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D. C. O'Reilly of the Oregon Round Lumber, owner of the Diamond O Line of river steamers operating on the Columbia and Willamette Rivers, and a member of the Port of Portland Commission, has purchased the steamers "Bailey Gatzert" and "Dalles City," formerly owned by the S. P. & S. and operated under the name of the Dalles, Portland & Astoria Navigation Company. This name will be retained. Among the new directors of the line is Erskine Wood of Wood, Montague & Hunt. Mr. Wood is the son of C. E. S. Wood, a leading lawyer of Portland, and a well-known Pacific Coast admiralty lawyer.

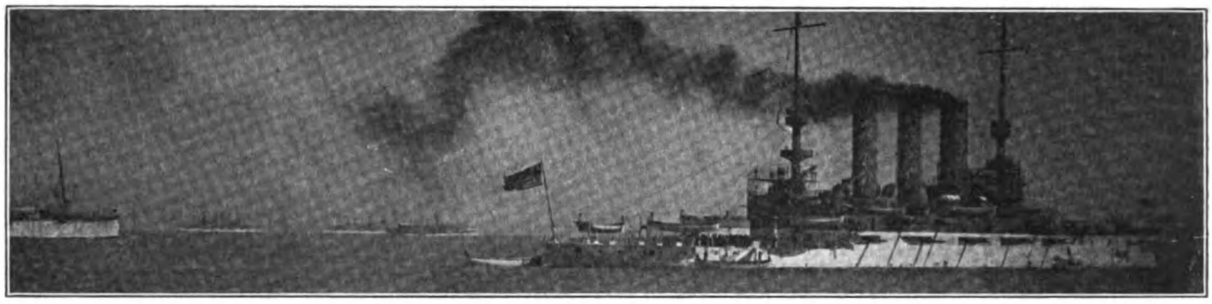
The British barks "Oweenee" and "Crown of India," which loaded wheat in Portland last fall for U. K., have each completed the voyage from Columbia River in one hundred twenty-one days. About four years ago the "Oweenee" made the same trip in one hundred and five days.

Among the laws introduced at Sacramento it would seem that about 90 per cent. are absolutely useless except to furnish copy for heroics or comics. While the regulation of the use of navigable waters is a Federal prerogative, it is only natural that some of our State statesmen should try their hand at marine legislation, and so there was a bill introduced which was to compel all motor boats not large enough to carry life boats to have metal hand rails fastened on the outside of their hulls either at the water line or the keel. This is the first time to our recollection that any thought has been taken looking towards the comfort and pleasure of mermaids. They have always been deprived of putting their feet up on a bar, not having any feet, but they may now get their hands on the railing at any rate. Another advantage will be that in case a motor boat sinks, its owner can hang on to the railing and won't lose his property.



The yacht harbor at the Panama-Pacific International Exposition.

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European Marine Notes

[From our own Correspondent.]

London, May 1, 1915.

Liners and Lost Traffic.

There is a general impression that shipowners are amassing wealth out of the war. However true that may be in certain cases, there are directions in which losses are sustained. Apart from the curtailment of services delays in getting ships unloaded and reloaded, the changes of ports, the difficulties and dangers of navigation through the war zone, much profitable traffic has ceased. There is, for example, the cessation of the tourist traffic which, in normal times, goes on to the great profit of the liner companies throughout the year, not only in summer. There has been no winter season at Cairo and elsewhere in North Africa. I am told that scarcely a tourist has been seen in the West India Islands since September. Invalids, real and imaginary, have not gone to the Mediterranean resorts. No one is going for the journey round the world. There has been no tourist traffic worth thinking about since last July, and there is not likely to be any this year. What is more important still, from the financial point of view, is that business men have cut down their oversea travel to a minimum. The collapse of credit in Latin America has stopped much of the traffic to and from that part of the world. The wealthy Argentine, Brazilian, or Chilean is no longer wealthy. All new enterprise has everywhere been checked. Business houses have been holding back their emissaries to the Far East. Emigration, too, has practically ceased. The shrinkage in the passenger trade is exceedingly heavy, and revival is not expected while the war lasts. There is another side to the story that the shipowners are piling up money.

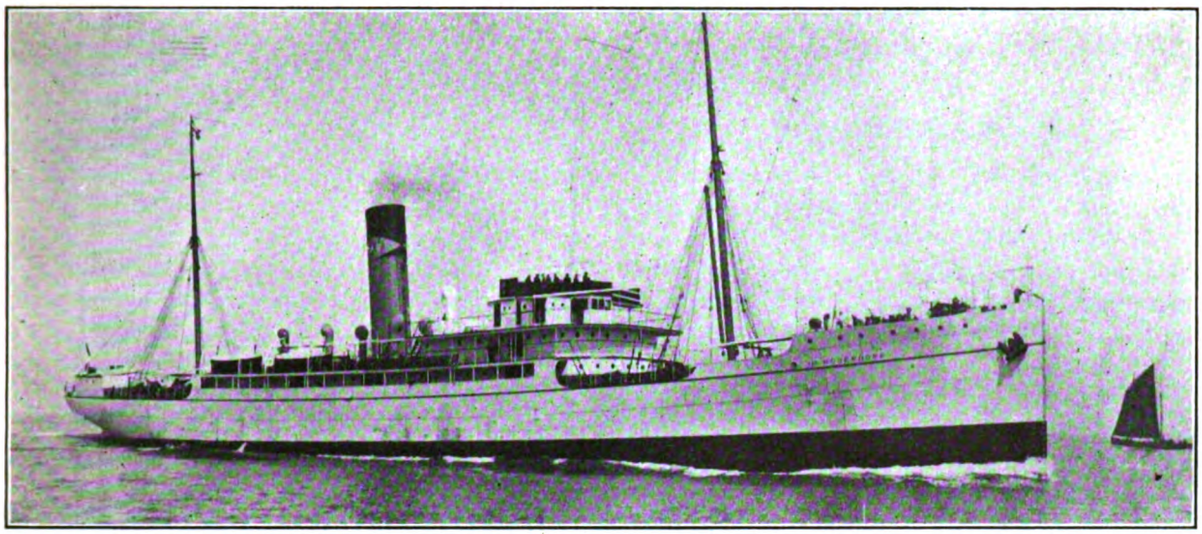
The Windjammer's Chance.

A seafaring correspondent directs my attention to the way in which sailing ships—not all square-riggers—are benefiting from the prevailing high rates of freight. Particularly is it noticeable how they are being fixed for the River Plate trade. Quite a large number of big American schooners, multi-masted craft usually employed in the American coasting trade, have found far more remunerative employment in carrying coals from Norfolk (Virginia) to Buenos Aires. In the Argentine they will load wool and hides for the homeward run. It is not often that four or five-masted packets of this description go into the deep-water trade, and when they have done so their voyages have not always been successful. The seven-masted schooner Thomas W. Lawson, for instance, a vast deadweight carrier, once attempted a voyage from the States to London, but was totally lost at Scillies. Another batch of sailing ships, this time square-rigged packets of the usual tramping class, are on their way to Argentina from ports in the Antipodes. It is said that over a dozen vessels have sailed from Australia in ballast to load grain for Europe. One notable clipper to sail outwards from London with cement to the River Plate is the ocean training-ship "Port Jackson." She, too, is to load grain for the homeward trip. And the booming times have brought back into service a number of ancient sea captains.

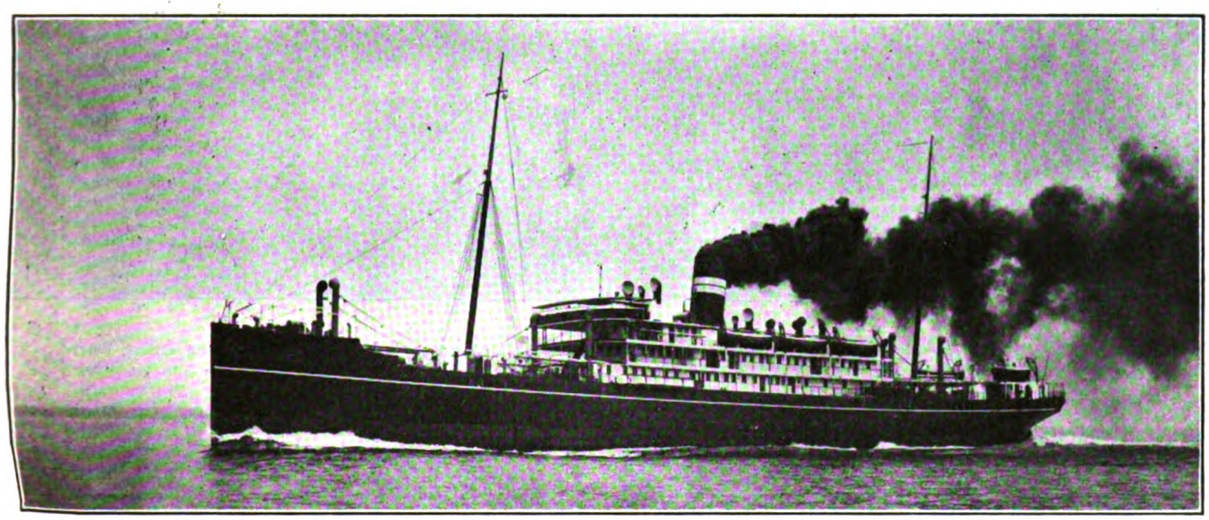
The Shortage of Merchant Officers.

There is a growing shortage of officers in the mercantile marine, caused by the withdrawal of the Royal Navy Reserve men and the large numbers of officers who have taken commissions in the fleet auxiliaries and special war services. New demands are being constantly made by the Admiralty—for instance, the recent offer of commissions for important duties under the yacht patrol. Over 2000 merchant captains and officers are now on active service in the R. N. R. The demand for officers for the ordinary merchant service at present greatly exceeds the supply. Some of the big mail liners which usually carry five or six officers besides the captain, now carry four, and the slower boats often carry three instead of four. Officers are urgently needed for what may be called Government mercantile work. The cutting down of the staffs of the ordinary merchantmen means a severe strain on those who remain in these days of lurking submarines. The steady drafting of officers into the navy continues in spite of the excellent pay now

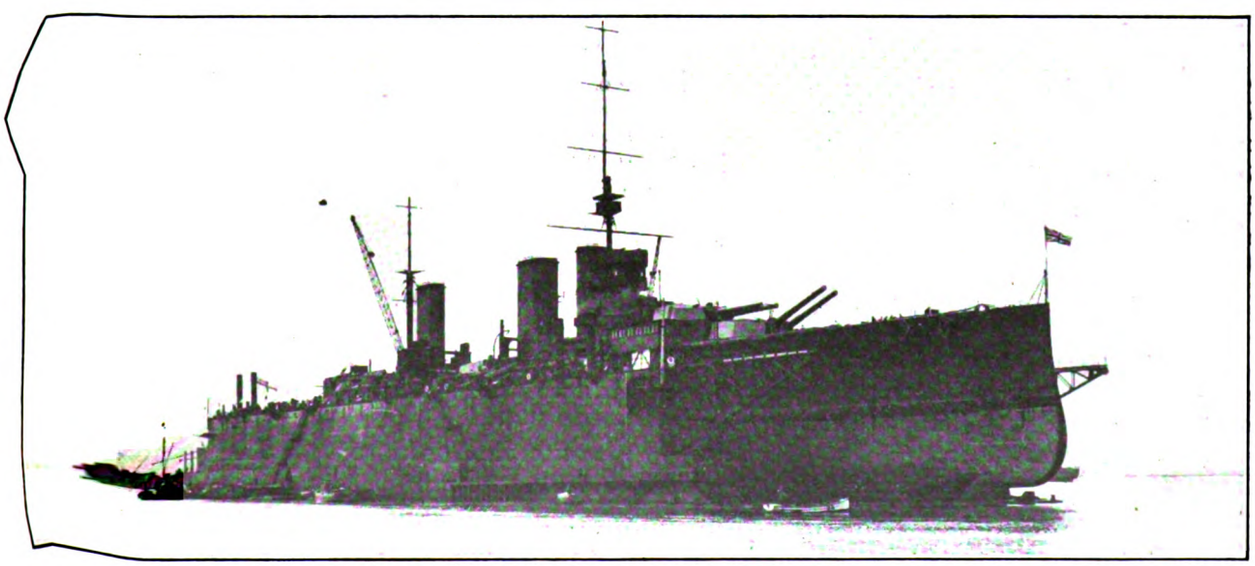
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The "Von Hogendorf," a passenger ship with large refrigerated holds for carrying fruit.

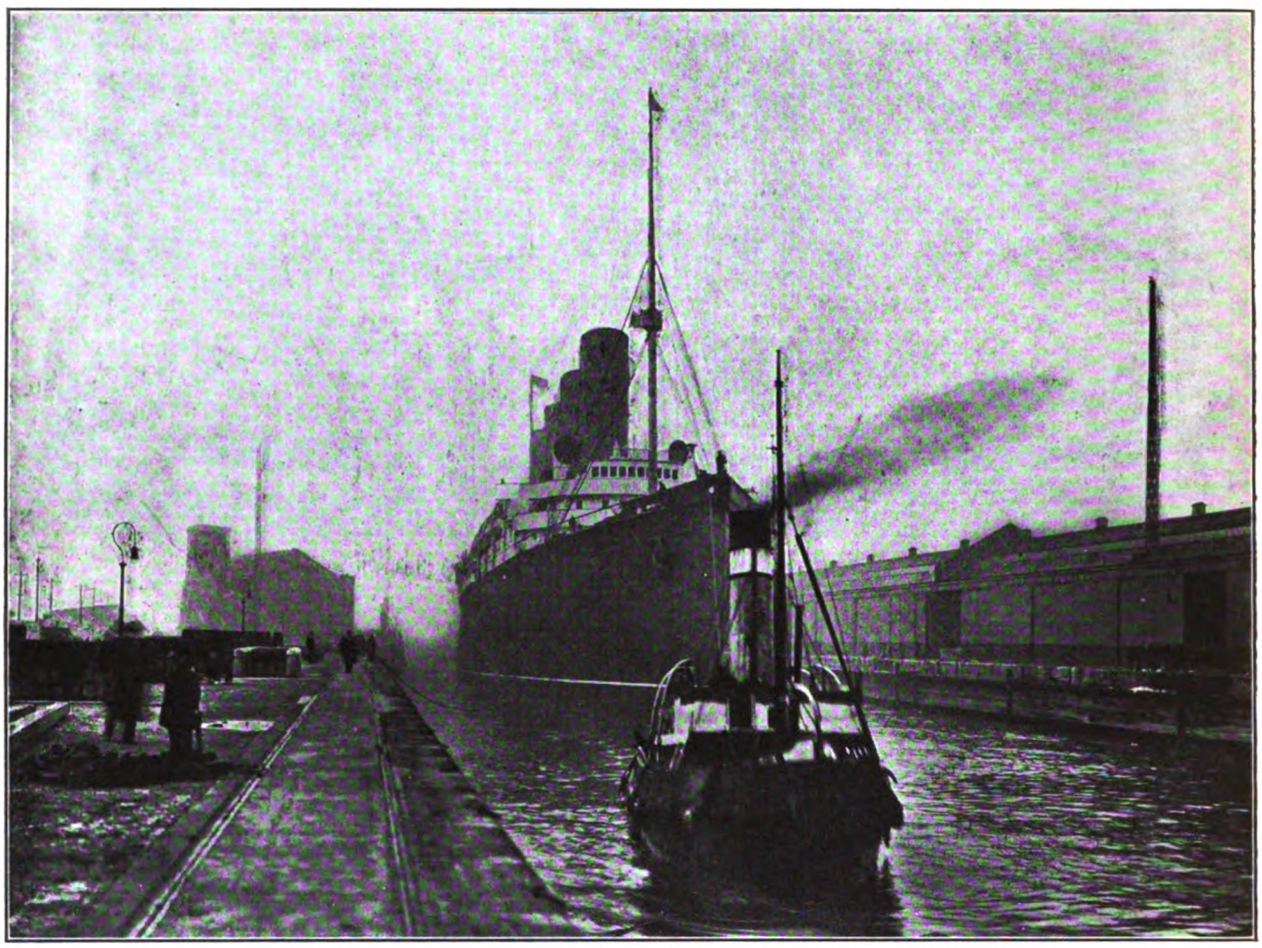


The "Varela," a new boat for the Indian and Persian Gulf service.



The Medway 33,000-ton floating dry dock with a British battleship.

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The "Lusitania." The speed queen of the Atlantic service whose sinking by a torpedo shocked the entire world.

offered in the merchant service. A first officer can now make from $70 to $80 a month, not counting the war bonus, and second and third officers are paid in proportion—a substantial increase on pre-war rates. The merchant pay is considerably higher than the pay on active service, but that is a consideration which does not weigh at all with the officers. They want to serve their country, and are doing it splendidly on all the seas. Officers who go on active service may have their little grievances, chiefly concerned with the desire for more definite rank, but these do not affect their keenness to serve. At the offices of the merchant officers' societies one hears many stories illustrating this. A master of a steamer on the Amazon came home the other day, and would take no appointment but on naval service. Several have come home from Australia and refused excellent offers. A fourth officer on a liner is now navigating officer on a salvage steamer in the Mediterranean. Many are very keen on serving on submarines. When you ask for views on the German submarine peril you are told briefly that the officers don't care a cuss about it. "There isn't a single white-feathered man." Captains and officers have been known to say good-by to their friends in the London offices of their societies and a day or two later to turn up again, having been torpedoed in the interval. "Shaken?" said an official, recounting one of these incidents. "Not a bit of it. Quite pleased with themselves. They treat the war as if there were no war."

Requisitioning Merchant Ships.

For a long time there have been complaints about the unsystematic way in which the British Admiralty has taken up merchant ships, some owners having nearly all their tonnage commandeered, while others have escaped. Naturally in view of the high freights current and of the comparatively low rates paid by the Government there have been protests against the inequality, with the result, I hear, that a better proportion will be maintained in future. There is again a big demand for vessels for transport and other purposes, while the Italian Government is chartering a large number for the carriage of grain and coal from the United States. In consequence the price of steamers both old and new is increasing. In fact, I hear of one boat which was purchased last June for $37,500 and has just been resold for $100,000. Several companies are, I believe, disposing of their entire fleets at the values now ruling,

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and will come into the market when buying is more favorable.

Prize Ships Under the Hammer.

The inflated prices that are being given for prize ships at the sales suggest that owners expect to make big profits while freights remain at the present figure. There was remarkably brisk bidding at the Baltic Exchange on April 16, when three ex-German ships were sold. These were the last sailing ships seized in home waters remaining to be sold, although there is one awaiting auction at the Cape. The big room, with tiled walls like a swimming bath, was crowded with owners and agents, including several Norwegians. Scandinavian shippers have shown great keenness to acquire prize-ships. Expert opinion agreed that the prices were very much above the peace-time value of the ships. The steel four-masted barque "Odessa," captured by H. M. S. "Coronia" early in the war, sold for $43,500. She is a Harland & Wolff ship, built nearly thirty years ago, of 2,915 tons register and carrying about 4,800 tons. As in the case of other captures she has been put from the German into the English register. The barque "Ulrich," a more modern vessel of 2,201 tons register (caught by H. M. S. "Venus"), was sold for $53,250 after lively bidding; but the greatest excitement was shown over the "Ponape," a fine Genoa-built four-master, about ten years old, with carrying capacity of 3,600 tons. The bidding went up sharply from $35,000 to $72,750, at which price she was sold to a Hull firm. This was an extremely good price. The bid that just did not succeed was that of an owner who will probably become a sort of legend among shippers. He began his career as an owner a short time ago by buying two sailing ship prizes. He had been previously in quite another line of business. The story is that it occurred to him he would like to own ships because he thought they looked *so beautiful* from the cliff at Cromer, where he played *golf.*

Shipping Mine Risk Agreement.

For many years underwriters have accepted, without extra premium, the risk of damage caused to shipping through striking live mines which had come adrift. The concession after the termination of the Russo-Japanese war was worth having by owners, and it was continued during and after the Turko-Italian war. To-day the risk has grown to immeasurably greater proportions. No one knows when, perhaps long after the termination of hostilities, the engines now let loose by the German Admiralty will reap their harvest of mischief. Many 12 months' insurances on fleets are now being placed which will not begin to take effect before January next or the end of March, 1916, and London underwriters have agreed that from now onwards they will not include in the ordinary marine policy this risk of drifting mines. The drifting mine risk henceforward in peace time is to be a special risk, and owners who wish to insure against it will be asked to effect separate policies.

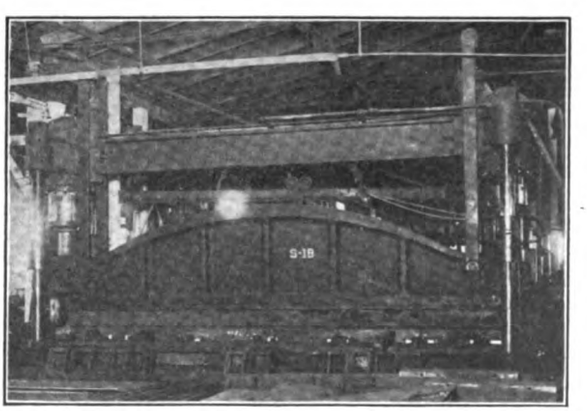
Recent British Launches.

I am able to give herewith four interesting photographs of recent launches here which I think will interest readers of this journal. They are all the work of Swan, Hunter, and Wigham Richardson, Ltd., of Wallsend-on-Tyne. The "Varela" is a fine passenger ship recently delivered to the British India Steam Navigation Company for their India and Persian Gulf service. The "Van Hogendorp" is designed for carrying fruit and also fitted with extensive passenger accommodation. The "San Gregorio" is one of a large number of oil tank steamers recently built for the Eagle Oil Transport Company, Ltd. This vessel and her sister ships carry 15,500 tons of oil in bulk and rank amongst the largest oil tank ships in the world. My other picture shows the Medway floating docks of 33,000 tons lifting capacity. The view shows a battleship in the dock.

The British freighter "Epsom" has been undergoing temporary repairs at the yards of the Seattle Construction and Dry Dock Company. Her damage was occasioned by stranding in the Straits of Magellan.

The Harrison Line has been hard hit by the German submarine warfare. The sinking of the "Candidate" and "Centurion," both vessels familiar to the people of this Coast, brings this concern's losses up to six vessels. Despite these heavy losses, however, the company is still maintaining its Pacific Coast service.

John T. Craig, of the Craig Shipbuilding Company, Long Beach, was in San Francisco during the early part of May, conferring with naval authorities in reference to the building of submarines at his plant.



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Freight Report

By PAGE BROTHERS

Since our last circular was written, the scarcity of tonnage has made charterers enter the market and pay freights apparently beyond what was considered reasonable, which has happened in all parts of the world, due, of course, to war conditions.

From the North Pacific the steamer "Hesperos" is reported chartered at 82/6 for U. K. by M. H. Houser, and he has also chartered steamer "General Y. Pesqueira" from Portland with wheat and oats at 70/- per ton, followed by the steamer "Mackinaw," by the same firm, also for Australia with grain, more or less on the same terms of freight as the "General Y. Pesqueira." Girvin & Eyre chartered the steamer "Yucatan" also for grain, principally oats, from Portland to Australia on private terms but said to be at lower rates than those quoted above. With the exception of the "Hesperos," these steamers are all coasting vessels, and though small, have been pulled into service on account of the extraordinary rates being paid, and much more profitable to them than anything they could do on this Coast.

It is reported by cable to-day that two more French vessels have been chartered for new crop loading at the North, one by M. H. Houser and the other by Balfour, Guthrie & Co., at 68/9 for U. K.

Lumber freights have shown remarkable activity and decided advance in rates, especially to Australia. It seems as if one of our shippers had suddenly realized that on account of no steamers whatever being available on time charter or per thousand feet to carry lumber to Australia, that it would be advisable to charter coasting vessels in place thereof, and in a telegraphic way this must have struck the other shippers as well, as they all came into the market, with the result that since the 20th of April, when freights were 65/- to Sydney and 75/- to Melbourne, about 35 of our coasters have been chartered for Australia on rates ranging in April from 67/6 Sydney and 77/6 Melbourne or Adelaide, to 75/- Sydney and 85/- Melbourne or Adelaide at the present moment, and which is practically bid to-day for more tonnage without success. The few sailers unchartered are asking 80/- Sydney, 90/- Melbourne or Adelaide. The financial conditions in West Coast being still about the same, has been the cause of very little chartering in that direction, Grace & Co. being the only charterers and having taken four Peruvian vessels on private terms, presumably about 60/- direct.

For the Orient very little business has been done, Pacific Export Lumber Co. having chartered the steamer "Kenkon Maru No. Eleven" on time, delivery Portland, and re-delivery Japan via India, on private terms. The Robert Dollar Co. chartered the steamer "Kaifuku Maru" also on time, said to be at 8/6 on the deadweight, delivery Honolulu and re-delivery Japan, presumably via Vladivostok.

For Africa one vessel has been chartered, Norwegian bark "Endymion," from Columbia River or Puget Sound to a direct port Cape Town, Delagoa Bay Range, at 120/- per thousand feet (the highest yet), reported by Heatley & Co., London. Two steamers, the "Gryfevale" and "English Monarch" have been named to Messrs. G. F. Neame & Co. by shipowning firms who have guaranteed freight to Neame & Co. at 97/6 per thousand to carry lumber and/or ties from Puget Sound to U. K. ports. The rate to-day would be at least 120/- for large steamers, as for large parcels by regular liners 150/- per thousand is freely paid.

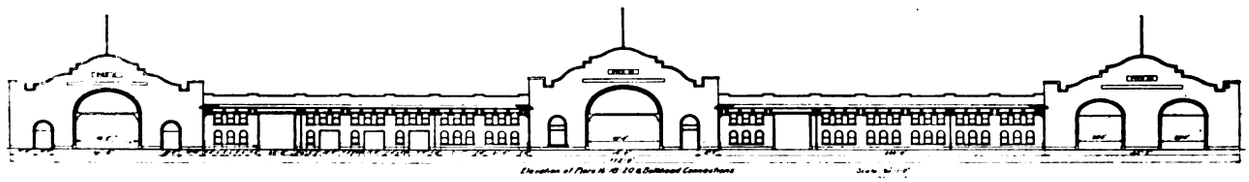
In outside charters the main feature has been the naming of several steamers by the Australian Government which will be sent here to load hay or oats from San Francisco to Melbourne or Adelaide. The rate reported as being paid these captured German steamers is about $15 per ton, weight. The first one is practically loaded to-day, ex "Wotan" now "C 12." Of those to come there are the steamers "C 5," "C 7," "C 9" and also the "Uskmoor" and "Werribee." The United States Government has chartered the "Colusa," "St. Helens" and the "Wm. Chatham" all for coal from Norfolk to Tiburon, San Francisco Bay, and a steamer to be named of about 6 or 7000 tons for San Diego at $7, also steamer "Alvarado" at $6.95 for San Diego. As showing how lumber freights are from the Gulf of Mexico to the River Plate, we may mention charter of the steamer "General Hubbard," by the time-chartered owners Sudden & Christenson, to a firm in New York at 135/- per thousand feet, and she returns from Buenos Aires with cargo of quebracho wood.

Time Charters: Very few foreign steamers offering, and last rates paid have been for Japanese steamers at 11/- on the D/W, delivery and redelivery Japan, Pacific Ocean trading.

Plans for a new ferryboat to supplement the regular boat during the day and run all night between Seattle proper and West Seattle have been ordered by the Port Commission.

The Electric Boat Company has laid the keel of the big $1,350,000 submarine "Schley."

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Passenger and Freight Piers in San Francisco

By FRANK G. WHITE,
Assistant Engineer, Board of State Harbor Commissioners.

PASSENGER galleries communicating directly with the upper decks of the steamships, adjustable cargo aprons to permit of discharging through the side ports at all stages of the tide, and spur tracks connecting with the Belt Railroad and the transcontinental railways, are some of the features of the new piers which are being built in San Francisco by the Board of State Harbor Commissioners for the accommodation of the Pacific Coast Steamship Company. The two new piers, which are designated as Piers No. 16 and 18, are located on the Embarcadero between Howard and Folsom streets and will be used in conjunction with Pier No. 20, which will be lengthened to meet the needs of the company.

In designing the new piers an effort was made to adapt them as nearly as possible to the business handled by the steamship company. In conjunction with the officials of the company a study was made of the methods used in handling cargo and passengers and the plans were worked out so as to facilitate as much as possible the operations of loading and discharging.

At the location of these piers it was impossible to reach hard bottom for a foundation. Test piles driven before the plans were completed reached a depth of 125 feet near the outer ends of the piers, and did not bring up. On this account it was decided that the construction of concrete structures would not be justified, taking into consideration the expense and the time which would be required, and that the best type of construction for this site would be creosoted pile timber piers.

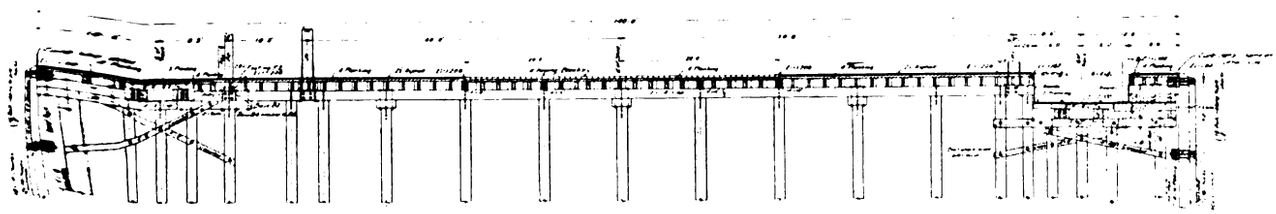
The deep mud necessitated the use of extremely long piles, the bearing piles varying from 85 feet to 105 feet in length and the brace piles from 90 to 115 feet in length.

Dimensions.

Piers Nos. 16 and 18 are exact duplicates of each other and are each 140 feet in width and 680 feet in length. The pier sheds are 100 feet in width, leaving spaces outside the sheds of 21 feet on the north side and 19 feet on the south side.

As is the case with all of the new piers and bulkhead wharves, these piers are designed to carry a uniformly distributed live load of 500 pounds per square foot. The portions under the tracks are designed for the standard 75-ton switching locomotive followed by a uniform load of 5,000 pounds per lineal foot of track, with an allowance of 50 per cent. for impact of moving load. The piles are so spaced that the load on each pile shall not exceed 30 tons.

It is planned that in general the steamships will berth on the south sides of the piers, and the railroad tracks, passenger galleries and cargo aprons have been located in conformity with this plan. The railroad tracks are located on each side of each pier outside the shed. The north track extends the full length of the pier and is depressed so that the car floors are approximately at the elevation of the pier deck. The south track extends only as far as the first cargo apron and the rails are flush with the deck of the pier. This arrangement will permit of heavy or bulky freight being discharged from the forward overall hatches directly on to flat cars, while freight which is to be transported in box cars can be segregated on the pier and then trucked into the doors of cars on the opposite side of the pier from the slip. The deck system consists of 12-inch by 14-inch caps, 4-inch by 14-inch stringers under the cargo space, 6-inch by 12-inch stringers under the driveway and 4-inch planking. There are three 6-inch by



Cross section of pier showing general method of construction.

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16-inch stringers under each rail of the railroad tracks and the rails rest on 8-inch by 8-inch ties which are bolted to these stringers. The bottom and sides of the track depression are boarded up for safety but the depression is left unpaved.

Cargo Aprons.

On the south side of each pier are three adjustable cargo aprons and two fixed cargo inclines which are to be used for loading and discharging through the side ports. The fixed cargo inclines are 21 feet in length and 6 feet in width and extend from a point 2 feet inside the shed to the edge of the pier at which point they are 6 feet below the deck. There are grooves along the sides of the inclines in which loose planks can be laid to cover them over to facilitate trucking when they are not in use.

The adjustable aprons are 31 feet in length and 10 feet in width and extend from the edge of the pier to a point 12 feet inside the shed. They are hinged at the inner end and at the outer end are carried by chains which pass over pocketed chain wheels to the counterweights. The chain wheels are keyed to shafts upon which are mounted worm wheels which engage vertical worms, the whole being carried by short posts resting on the deck. The worms are operated by horizontal hand cranks and the outer ends of the bridges can be dropped 9 feet below the level of the deck.

Sheds.

The pier sheds, which are constructed of timber, are 100 feet in width and 22 feet high to the lower chords of the trusses. The main trusses span from the north side of the sheds to the passenger gallery, 10 feet from the south side so that the center of the sheds is free from columns. Monitors with continuous windows extend the full length of the sheds and these together with the windows along both sides above the doors will furnish ample light.

The doors are Kinnear steel rolling doors and in general the openings are 18 feet in height and 19 feet in width alternating with closed wall panels 21 feet in width.

In order to enable passengers to reach the steamships without the necessity of dodging the teams and stevedores on the main deck of the piers a passenger gallery is provided along the south side of each pier. Each gallery is 10 feet in width and is reached by way of a ramp which starts near the front of the shed and slopes up on a 20 per cent. grade. Two flights of stairs also lead to each gallery, one near the center and one near the end of the shed. The galleries communicate with the ships by means of passenger aprons, two to each pier, which are adjustable in height to suit the tidal changes.

Passenger Aprons.

The passenger aprons are 10 feet in width and extend from the side of the shed to within 2 feet of the edge of the pier. The inner end is hinged and the outer end is carried by a head frame resting on the deck. The operation is by means of a hand chain, which engages a pocketed chain wheel mounted on a shaft extending across the top of the headframe. Mounted on the same shaft are a pair of worms which engage with worm wheels and operate the pocketed chain wheels carrying the main chains. The movement of the passenger aprons is 4 feet above and 5 feet below their level position.

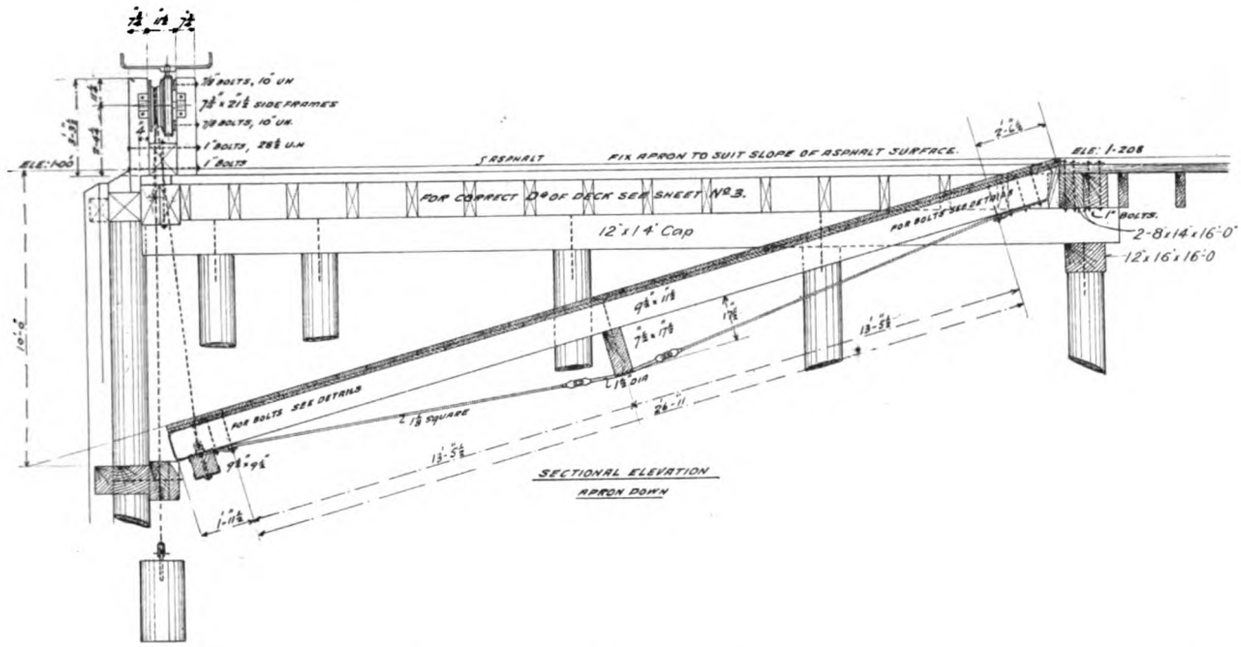
The new bulkhead wharf upon which these piers abut is 60 feet in width and extends from the waterfront line to the curb line. The supports are concrete piles and the asphalt paved with timber deck is carried on steel beams. In order to make this wharf of the greatest utility a width of 45 feet has been enclosed by a bulkhead building, leaving a 15-foot sidewalk adjoining the curb. This building extends from the north side of Pier No. 16 to the south side of Pier No. 20, the total length being 773 feet, and the portions between the piers are two stories in height. The first story is 30 feet in width, leaving a passage 15 feet in width adjacent to the edge of the wharf. The second story is 40 feet wide, the projection forming a shelter over a part of the passage. The first story between Piers Nos. 16 and 18 will be used for waiting-rooms and baggage-rooms and on the second floor will be the offices of the steamship company. Between Piers 18 and 20 will be the offices of the State Wharfinger, U. S. Customs officers, ships' stores, stevedores' room, etc.

Fenders.

The fenders used on these piers are a development from the suspended fenders used on the concrete piers. The suspended fenders require a solid, massive support such as a concrete structure to withstand the shock from a heavy vessel and it was not believed that they would prove entirely satisfactory on a less rigid timber structure. The commonly used green pile fenders have such a short life in these teredo and limnoria-infested waters that the maintenance expense is very large.

In the new type of fenders creosoted piles are spaced 5 feet apart and bolted at the top to a heavy compound stringer. There are two lines of ribbing each built up of three 4-inch by 16-inch planks bolted to the piles, one just above low water and one midway between the lower ribbing and the compound stringer. There is a row of chocks between the piles at each line of ribbing and at the compound stringer. Bolted to these chocks are 10-inch by 12-inch vertical sheathing timbers 16 feet in length and spaced 2 feet 6 inches apart by

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three lines of chocks. The lower line of ribbing and the chocks between the piles on the line of the lower ribbing are creosoted as they are submerged a large part of the time. It is expected that the creosoted piles will outlive several sets of green piles and that the maintenance of the sheathing will be comparatively inexpensive.

Instead of mooring piles or mooring bitts such as have been used on the new concrete piers, large cast iron mooring cleats have been used on Piers Nos. 16 and 18. As they are only 10 inches high above the deck it was possible to locate the railroad tracks closer to the sides of the piers than if the large bitts had been used.

The driveways on these piers are paved with *wood* blocks laid without a sand cushion such as is ordinarily used. Over the deck planking is laid one thickness of 14-pound roofing felt which is well mopped with hot asphalt. The blocks are laid while the asphalt is soft and the joints are filled in the usual manner. The blocks are Ohia wood from Hawaii. The cargo spaces on each side of the driveways and the spaces outside the sheds are paved with asphalt laid directly on the plank deck.

The piers and buildings when completed will cost approximately $435,000. The work is being carried out under the direction of Jerome Newman, who is Chief Engineer of the Board of State Harbor Commissioners, Carl Uhlig and the writer are Assistant Engineers, and H. M. Kebby is the Chief Inspector. Pier No. 16 is being constructed by Healy-Tibbitts Construction Company and Pier No. 18 by the San Francisco Bridge Company.

One of Seattle's Institutions

The Pacific Net and Twine Company is a Seattle institution which, while started as late as 1897 has already reached the proud position of what is probably the largest fisheries' supplies house in the world to-day. It was established as a branch of the Portland firm of Honeyman and McBride and occupied the basement of the Dexter-Horton Bank Building, corner of First avenue and Washington street, Seattle, and the managers started at once to specialize on the needs of the large and growing fishing fleets of the Pacific Northwest.

The rapid growth of the firm's reputation and business necessitated several moves, the latest being to pier 8, where a modern and unique business is carried on. Any craft from a fishing boat to a large steamer can lie at the Pacific Net and Twine Company's dock and be completely rigged, outfitted, provisioned and prepared for sea. During its seventeen years of business existence, this company has expanded from a basement with 1,800 feet of floor space to the sole occupancy of a large dock with 89,700 square feet of floor, and the original force of three employees has grown to forty. This remarkable growth has been the outcome of the Pacific Net and Twine Company's ability to hold its old customers year after year as well as annex new ones.

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Strandings

A VESSEL aground or ashore is always in a position of danger. This danger is not alone because of the damage the ship has received by the striking of the bottom, or that she may receive by resting on the ground where she stranded. A very great danger exists in the probability that she may and will (unless she is promptly and efficiently guarded against their effects) be moved by the action of the sea and tide from her original position of stranding, in which movement she is apt to sustain physical damage, or by being carried higher up on the strand the task of getting her afloat will be made more difficult and expensive, if not impossible.

Effect of Sea and Tides.

The effect of the sea and tides upon a stranded vessel is always towards forcing her higher up on the strand, or if the ship is stranded on an exposed coast higher up on the beach.

The effective power of these elements is tremendously increased because their greatest pressure against the stranded vessel occurs simultaneously with their lifting power on her. At the moment she is in the best position (by being less hard upon the ground) to be moved in any direction, viz., as she is lifted either spasmodically or gradually by the incoming swell or tide, the weight and power of the incoming swell is against her from seaward towards the land, with the inevitable result that if she moves at all she is forced higher up on the strand.

While these elements of the seas, swells and tides constitute the greatest menace to a stranded vessel (unless she be properly safeguarded against their injurious effects), these same elements when intelligently utilized may be made the means by which the vessel can be gotten afloat. Indeed, in many cases of serious strandings of vessels of considerable size, it is only by use of them that the successful floating of the stranded vessel has been accomplished.

The assistance rendered by the sea, swells, and tide in floating a stranded vessel is in their lifting power upon her.

If, as she is lifted either wholly or in part free from the strand, sufficient power can be put upon her to not only overcome the tendency of the incoming swell or tide towards forcing her higher up on the strand, but to pull her towards the deeper water, she must under such conditions move towards the deeper water.

If, indeed, she cannot be moved, but can only be held in her original position and prevented from shifting her position for the worse or moving further up on the strand, much good will be accomplished and the dangers already mentioned will be minimized.

It is the consensus of opinion amongst salvors having large experience in floating stranded vessels that a very large percentage of serious losses could have been greatly reduced in amount, and in many cases the vessels would have been floated without outside assistance, had those in charge of the vessel, when she first stranded, immediately taken the steps hereinafter suggested.

What to Do.

As soon as it is found that the vessel does not immediately come off the strand after her engines have been used either full speed astern or ahead as the exigencies of the case may require (and this can be determined in a very few moments) steps should immediately be taken to hold her in the place she has stranded to prevent her from moving higher up on the strand or otherwise shifting her position until such time as the conditions are favorable to attempt to float her.

In most cases this can be accomplished by the use of the anchors as below suggested, but as the handling of the heavy anchors usually takes some time, it is often advisable where it can be done that additional weight be at once put in the vessel by filling the ballast or other available tanks with seawater. This additional weight will hold her harder on the ground and assist in preventing her from working higher up on the strand; will lessen the danger of damage through pounding and can readily and quickly be pumped overboard when the time arrives for the attempt to be made to get the vessel afloat.

Without a moment's unnecessary delay the anchors should be gotten out and made fast to hold the vessel in her position and to prevent her being carried further up on the strand or from going broadside on the beach. This should be done, and immediately, even though it may appear certain that the vessel will come off on the high tide. No safeguard should be overlooked and every possible means should be taken to get the vessel afloat on the next high tide as it presents the one great opportunity which if not taken advantage of may mean greatly increased damages or even the total loss of the vessel.

It is desirable, especially where the vessel is stranded on an exposed coast, that the anchors used should be the heaviest available, viz: the bower anchors, but if because of their size and weight the difficulty of handling them will cause considerable delay, the kedge anchors should be run out as a temporary measure until the heavier (bower) anchors can be handled to replace them.

The anchors used should be run out as far as possible into deep water in the direction that it is wished the vessel shall come off the strand. They

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should be made fast (with suitable gear) to that part of the vessel which it is wished to move out first, which in most cases (as vessels generally strand bow on) would be the stern. As soon as the anchors are out and made fast to the ship they should with proper tackle be hove taut to hold the vessel in her original position.

As soon as the bower anchors have been run out into the desired position and made fast (if the vessel is in an exposed position both bower anchors *should* be put out) a sufficient strain should immediately be put upon them with the heaviest tackles available to keep the cables taut and hold the vessel in place until the tide is right to float her.

Avoid the mistake of trying to heave the vessel *off* the strand by main force. Such attempts do no good and may result in breaking the cables and tackles, thereby losing the anchors and leaving the ship worse off than she was before. Cases have occurred where the vessel has become a total loss because of such a mistake.

Wait until the tide is near flood or until the vessel shows signs that she is beginning to float, at which time by putting the heaviest strain on the anchors and working the engines full speed *either* ahead or astern, as it is desired the ship to move, there will be a reasonable chance of getting her afloat. Let the tide or sea do most of the work; the engines, if available, some; and the anchors some; but do not strain their strength or impair their usefulness until the time comes when they will be of avail. The main use for the anchors is to hold the vessel in place until she is ready to float; of the engines to get her out of a position of danger after she is beginning to float. If the hawsers are broken or strained, or the engines strained or disabled before that time the chances of success are being wasted.

Difficulty may be experienced in handling the large (bower) anchors. It must, however, be remembered that the fate of the vessel may and will probably largely depend upon the success in getting these anchors out and in the proper position, and all possible ingenuity and seamanship should be utilized to its accomplishment.

Where outside assistance has not been available the bower anchors have in some cases been run out by the use of the ship's boats rigged catamaran fashion; and in other cases the anchors have been floated out by means of rafts built from materials at hand.

Where steamboats (large or small) are available, the bower anchors have, in some cases, by means of a heavy line made fast to the crown of the anchor been dragged out by these steamers to the desired location.

With Those Who Do Things

IN a lecture on the cost of handling freight at terminals, Secretary Redfield is quoted as saying: "It costs as much to load a barrel into a car at Chicago and to unload it at New York as it does to move the barrel between the two cities on the railroad." In other words, it is the cost of the short haul that is the important issue confronting the railroad and steamship lines.

Similarly Mr. James J. Hill, that far-sighted, clear-thinking financier, has remarked, "Unless the facilities of the terminals of our railroads are increased, the congestion, ever growing, which often paralyzes traffic to-day, will result in industrial chaos." Mr. Hill's recent trip to the Pacific Coast and his minute study into its traffic conditions bring home the import of his remark most vividly.

It is not altogether strange that the Pacific Coast has given so little attention to its terminal facilities. All of the available energy, money and thought has prior to this time been directed to the development of the tremendous resources of the Coast. But now that the great Panama Canal is open to stimulate the commerce of the West, the Coast terminals must begin to prepare for the increased business that is bound to occur.

In some respects the Eastern terminals have shown us in the West the way to systematize traffic handling conditions, not the least of their efforts being directed towards providing mechanical means for handling freight speedily and economically.

A large proportion of the freight handling expense is due to the high cost and the scarcity of labor available for this purpose. This is a condition that is not likely to improve, as it is becoming more and more difficult to find men suitable for this work. The adoption of various mechanical systems has relieved this situation to a very large extent, the laborious part of the handling work being accomplished by this mechanical means, the truckmen merely supplying the needed intelligence to transfer a package of freight from one location to another.

The ordinary two-wheel hand truck, which can be placed under the package, bale, barrel or box, has been found, generally speaking, most satisfactory within certain limits. When it is necessary, however, to transport a loaded truck up an incline or for a considerable distance on a level, the men and the truck become inefficient and expensive.

The machines illustrated here, known as Otis Inclined Elevators, have had wonderful success in

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FIREMAN'S FUND
INSURES HULLS, CARGOES,
HEAD OFFICE: CALIFORNIA AND SANSOME

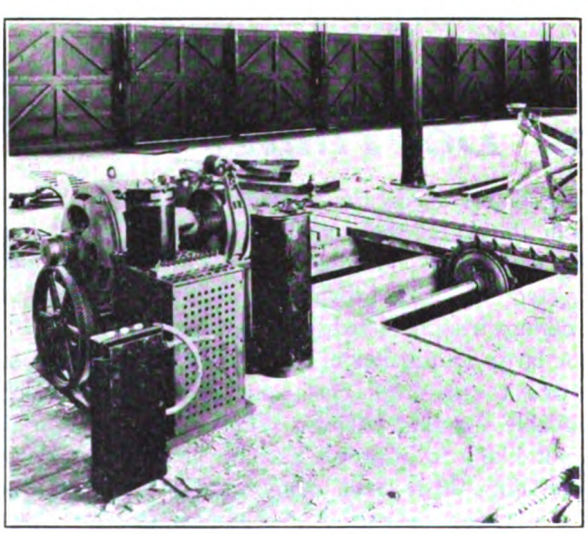
JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

eliminating the laborious part of manual trucking in handling miscellaneous freight, in reducing the handling cost and in accelerating the speed of loading and unloading ships and cars.

Mr. Albert Smith, General Agent of the Metropolitan Steamship Company, New York City, has stated that the three Inclined Dock Elevators which were installed at the Union Wharf of his company at Boston, Mass., have not only been the means of a large saving in the cost of handling their cargoes, but that there has been a saving of 20% in the time required to unload the ships. He also states that they unload from 1,000 to 1,500 tons of freight per day over the inclines, which previously required the labor



The motive power of an inclined elevator requires very little space.

of 150 men, and that the cost for electric power is $30.00 per month. The machines are used only during the periods when the inclines, owing to the position of the ship, are at an inclination and not when the gangway is level. He, therefore, estimates that during this period the three machines are carrying 125 tons of freight per hour, during a period of five hours each day at 20 cents per hour for current, thus making the power cost 1 cent for every six tons of freight carried on the machines.

At other points where these machines are used the results are even better. For instance, at the Pequonnock Dock of the N. Y. N. H. & H. R. R. at Bridgeport, Conn., a careful computation of power costs shows that it costs but one-tenth of a cent a ton to move freight in this way and that the cost of handling has been reduced from 26 cents to 17 cents a ton. It is interesting to note that in this particular case, for which the Inclined Elevator was originally designed, the use of the pier was made possible by the installation of these machines. The tide conditions, which vary from eight to ten feet at this point, rendered the angle of incline from boat to pier so steep that it was impossible to haul freight up the gangway, and the docks remained unused for several years. The machines have now been in use about five years and have given uniformly satisfactory service. So much so, indeed, that no repairs whatever have been necessary during this period.

At the New York Central Railroad freight terminals in Weehawken, N. J., four Inclined Elevators have been in operation for over a year and although results have been tabulated during a depressed business condition, yet the road's officials have observed a saving of 2 to 3 cents on every ton of freight moved at this point in addition to an increase in the capacity of the marine equipment of from 20 to 40 per cent.

It is reported by the Merchants and Miners' Transportation Company of Boston, Mass., that a saving of from 13 to 15 per cent has resulted from the installation at its Mystic Wharf Terminal in Boston, Mass. This company has two machines at its Savannah, Ga., terminal, four at its Mystic Wharf terminal, Boston, Mass., and six at its new city terminal in South Boston.

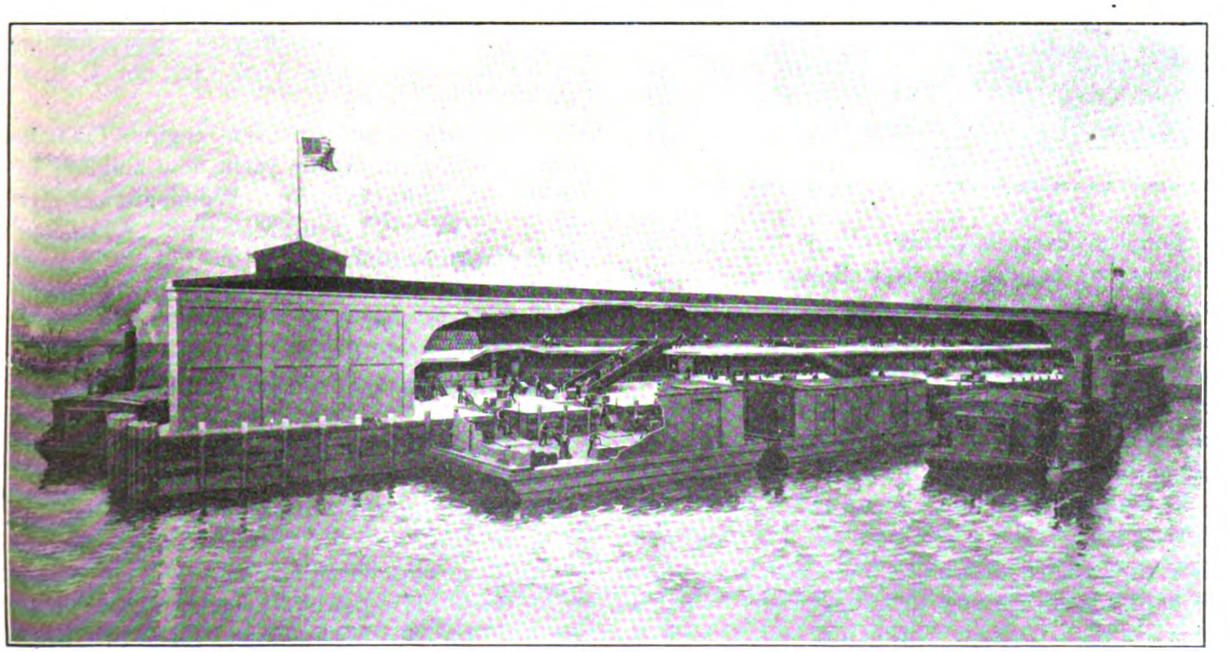
The Inclined Elevator is very simple in construction and operation and can be installed on any shipping platform or gangway, or in any warehouse or freight station to connect one floor with another. The machine consists of an endless chain of special construction, provided on its lower side with malleable iron shoes, which slide in a lubricated steel channel supported upon a wooden bolster bolted to the incline. The upper surface of the chain is provided with projecting teeth or lugs. These lugs engage the axle of the truck as it is drawn on the incline, and

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FREIGHTS AND DISBURSEMENTS
STREETS, SAN FRANCISCO, CALIFORNIA
W. H. WOODRUFF, Special Agent
220 BYRNE BUILDING
LOS ANGELES, CALIFORNIA
F. HERRMANN & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK
AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

thus the truck and its load are hauled up by the endless chain. The truck wheels, of course, support and carry the load. On reaching the upper end of the incline, the chain turns about the driving sprocket and the lugs release the axle of the truck, the wheels of the truck at this time being on the horizontal floor. The machine works successfully with either two wheel or four wheel trucks. With a two-wheel truck the man goes with the truck. In practice it has been found that there is very little labor, as the man leans back upon the truck handles and is, in effect, pushed up the incline. When the four-wheel truck is used, it is not necessary to have a man accompany the truck. Furthermore, the four-wheel truck is capable of carrying much heavier loads and at certain installations electric trucks are carried up successfully by this machine, carrying loads of upwards of two tons. The motor operating the machine is located on the upper floor at the side of the incline. The main shaft carrying the driving sprocket which operates the hauling chain is provided at its outer end with a steel spur gear, journaled so that the gear projects a considerable distance above the floor line. Meshing with this gear is a steel pinion mounted on a countershaft, which is journaled on a special bed plate supporting the motor. This countershaft carries a spur gear which meshes with a pinion mounted on the motor shaft. The motor is wound, when so desired, to produce two speeds, one of which produces a speed of travel in the hauling chain of 125 feet per minute and the other a speed of 250 feet per minute. The motor is also provided with a suitable friction brake, the handle of which is in a convenient position for the attendant who operates the machine. When desired, a reversing switch is provided which enables the inclined elevator to be run backwards for the purpose of carrying loads down the incline. All these operations are under perfect control of the attendant, and the construction of the machine is such that accidents or injuries to the men are practically impossible.

The upper sprocket wheel is centered on the hinge of the "Inclined Drop" so that the latter can be raised or lowered with the tide or as the draft of the boat increases and decreases with the loading and unloading, without affecting the machine itself.



Sectional view of a dock showing various uses of inclined elevators.

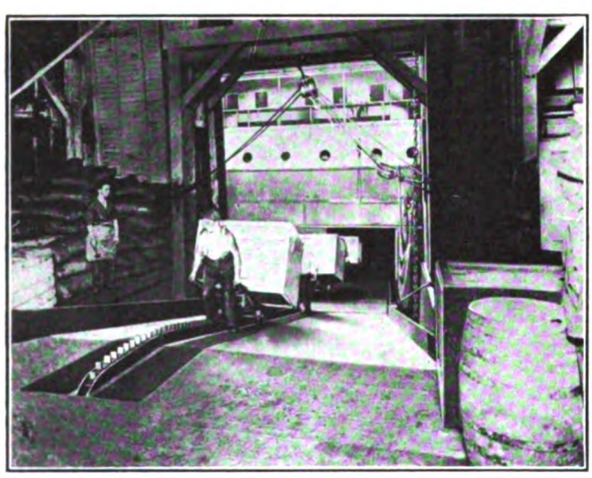
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The machines operate efficiently upon any incline up to 25 degrees from the horizontal.

Continuous motion is one of the important principles of the Inclined Elevator. A constant procession of loaded trucks can be carried along at a rapid rate. This has a tendency to speed up the entire system, since the men at the top must move rapidly to make way for the ascending trucks.

The double deck pier shown in the illustration is a further adaptation of this method of carrying freight trucks from one elevation to another on the continuous principle, both up and down. Double deck piers are coming rapidly into use, and it is being recognized that in addition to the very great saving in the cost of the ground area, they have a valuable economy in the handling and storing of freight. It can be readily understood that a two-storied pier as a freight storage proposition is twice as compact as an equal floor area would be if spread over one surface; that is to say, the distance from a central point to all other points on the two floors would be approximately one-half the distance of a central point from all other points when taken on a single floor.

The chief objection to a two-storied pier has been found in the fact that half the freight needs to be carried up and down between the two floors. This



The use of an incline elevator into the side port of a ship.

objection, however, has been practically eliminated by the use of the continuous working Inclined Elevator which has now proved its capacity and efficiency. A two-storied pier has an important advantage in that it permits packages of freight which usually remain in storage for several days or a week at a time to be transferred to the upper floor on the Inclined Elevators leaving the floor below available for the freight which needs to be carted away more rapidly.

Sets of Inclined Elevators, in addition to those mentioned above, are now operating at the Old Dominion S. S. Co., New York City; the Detroit & Cleveland Navigation Company, Detroit, Mich.; the Carolina Terminal Co., Charleston, S. C., and other places.

They are designed to operate on either direct or



Transporting freight from the lower to the upper deck of a wharf shed.

alternating current circuits. The Otis Elevator Company, 2300 Stockton street, San Francisco, Cal., is the manufacturer of these machines.

CHARLES L. SEABURY AND COMPANY BUSY.

The following will give an idea of some of the more important contracts in the course of completion, at the works of this company, Morris Heights, New York City:

"Seabury," steam marine triple expansion engines as follows:

1-18″ stroke triple expansion engine of 800 H.-P. for a hull building on the Pacific Coast.

1-21″ stroke triple expansion engine, 1,000 horsepower, for the new steam yacht now building at Jacob's Ship Yard, New York City, for J. B. Ford, Detroit, Michigan.

1-21″ stroke triple expansion engine, 1,000 horsepower, for the new steam yacht now building by the Pusey and Jones Company, Wilmington, Delaware, for E. L. Ford, Detroit, Michigan. Auxiliary machinery in connection.

"Seabury" safety, marine water-tube boilers under construction as follows:

Two boilers for Pusey and Jones Company.

One boiler for the "Sisilina," belonging to Nathan Strauss.

One boiler for the "Aria," belonging to Edward H. Blake.

One boiler for the "Inspector," installation at San Francisco, Cal.

Two boilers for Havana, Cuba.

One 32-45 horse-power 6-cylinder 4½″x5″ "Speedway," ordered by L. E. Geary, to be installed in a runabout for use in Alaska.

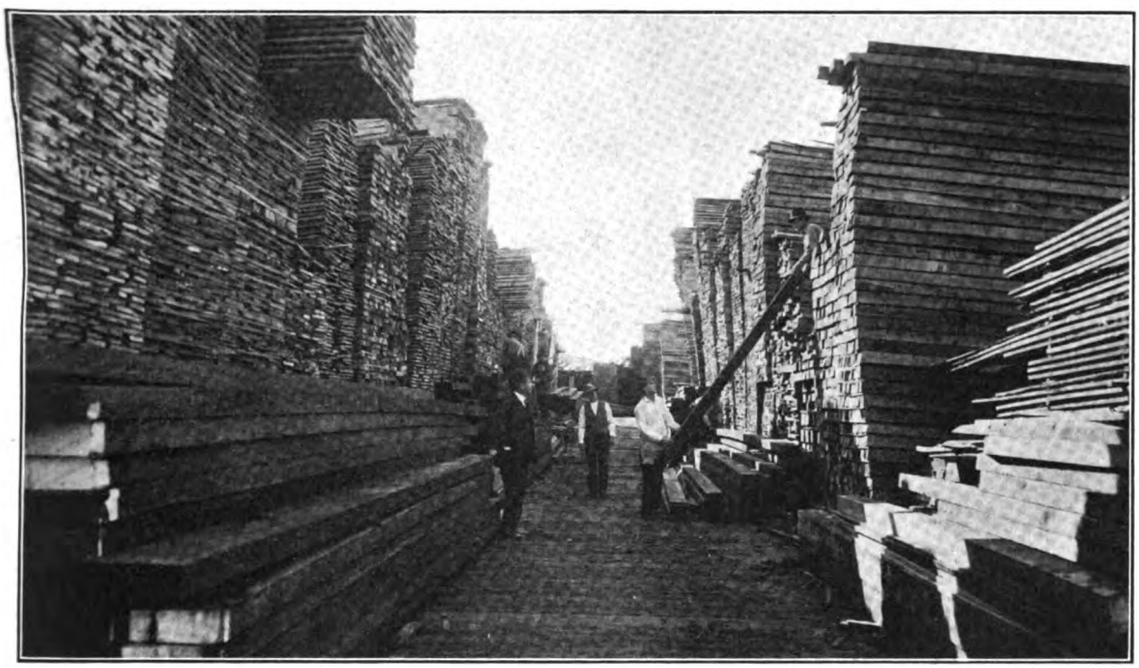
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Ironbark Lumber and Timber

The fenders, rails and hatch coamings of our coast vessels are made of an Australian hardwood which has proven superior to anything which grows in our own country. Ironbark, or, according to its botanical name, Eucalyptus Siderophloia, is the wood used. Its name shows that it is a member of the exceptionally numerous and prolific Eucalyptus family. Ironbark was introduced into this market about twenty-five years ago by White Brothers, the pioneer Hardwood Lumber dealers of San Francisco.

On the East Coast, oak is generally employed for fenders. On the Pacific Coast, in former years, before the advent of Ironbark into the American market, California laurel was the wood mostly utilized for this purpose. Ironbark, however, has driven all competitors out of the field. It is possessed of qualities which render it the ideal wood for chafing surfaces and the thriftiness of the growing timber makes it comparatively easy to obtain long plank, for instance, 20 to 36 feet. As every boat and ship builder knows, ample lengths are much more desirable than the ordinary dimensions. According to the rules of American hardwood grading, the regulation lengths are 10 to 16 ft. Anything over this length is extra. Ironbark, however, can be produced and is imported in lengths which make it much more suitable on this point alone than our domestic woods, which are very difficult to obtain longer than 16 feet and when gotten out especially in these extra lengths, become extremely expensive. In addition to the use of Ironbark for fenders, it is employed in heavy timbers, such as 14″x16″, 16″x18″, 20″x20″, etc., etc., for the keels of vessels as well as for the stern posts and rudder stocks.

It is not very easy in a few words to give a definition of Ironbark because it has so many qualities which recommend it for ship building purposes. It is heavy, almost the heaviest of hardwoods. This, in a great many instances, of course, is not a point in its favor, but the weight is an indication of its hardness, and this point is one which makes it very valuable for chafing surfaces. This hardness can be readily seen when Ironbark is touched with a plane or a nail is driven into it. The texture of the wood may be characterized as horny and its grain is more or less curly and intertwined. In addition to this there is a certain gumminess in Ironbark which apparently aids, in conjunction with its interlocking grain, in preventing checking to any serious degree.



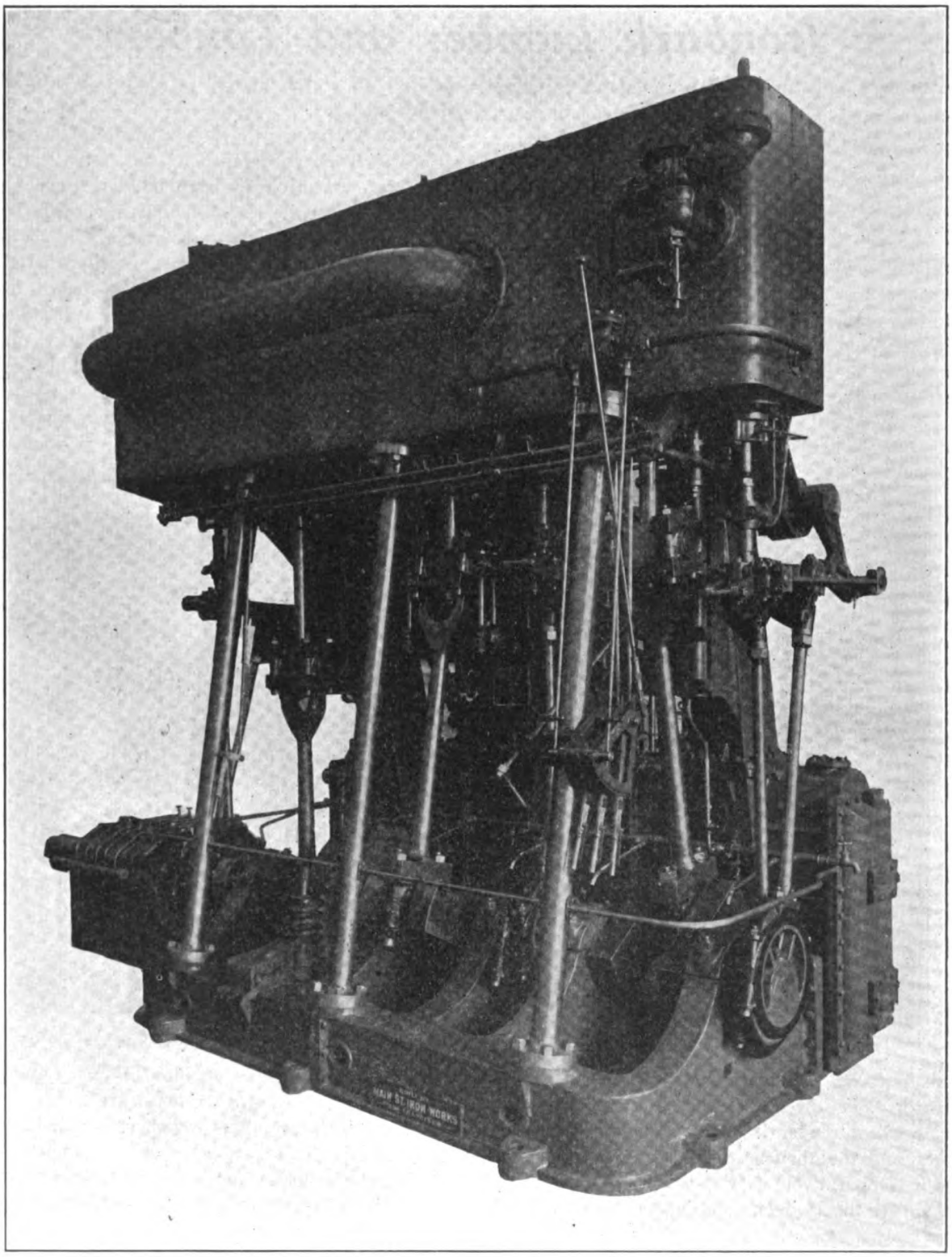
A gangway in the White Bros. yard—the heavy timber lying fore and aft is Ironbark.

Taking all these points together, it will be readily seen that Ironbark is a wood which almost appears to have been made for the sole purpose of providing fenders, rudder posts and keels for our wooden merchant marine.

There are a number of different kinds of Ironbark imported into this country, but the principal species is the Eucalyptus Siderophloia, which is red in color and easily distinguished from the lighter colored woods of coarser grain, such as Spotted Gum, Brush Box, Gray Gum, Stringy Bark, etc., which are also Eucalypti, and are sometimes sold for the same purposes for which Ironbark is used, but have not the magnificent wearing qualities of this king of hardwoods.

White Brothers, of San Francisco, carry at all

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The engines pictured above have just been installed in the new steam-schooner "Wapama" by the Main Street Iron Works, which concern has fitted the machinery in a large number of the coasting lumber carriers.

times an enormous stock of Ironbark lumber, plank and timbers, in conjunction with their general Hardwood stock, and in the photographs accompanying this article the long clean-looking plank lying fore and aft in the gangways is Ironbark.

Ironbark and all of the Eucalyptus family are designated as Gums, the Gum which is used as a cabinet wood in this country, is not of the Eucalyptus family, nor is it even a native of Australia. It belongs to a family of trees the botanical name of which is Liquidamber. These trees are natives of the Mississippi Valley and the southern portion of the United States. On this Coast the Southern Red Gum is sometimes erroneously classed as Eucalyptus. It has sometimes been said, for instance, that the interior

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finish of the Bohemian Club in San Francisco is Eucalyptus. This is entirely an error. The Southern Red Gum with which this building is finished has no relationship whatever with the Eucalyptus family of Australia of which Ironbark is the most noted and most valuable member.

SEARCHLIGHTS.

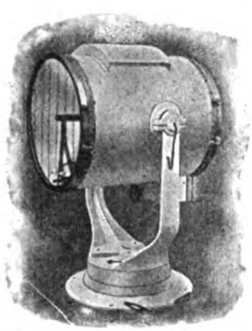
The Carlisle & Finch Searchlight projectors have become so widely and favorably known that they are now generally specified in preference to all others. They are constructed in a simple and substantial manner with all parts strong and accessible.

Each Searchlight, when it leaves the factory, is mechanically and electrically perfect; it has been put through a careful test, and has been operated for several hours to make sure every part is perfect.

In addition to their use on shipboard, of late years searchlights have been used very largely in industrial operations, for lighting excavations for night work, for dams and bridge building.

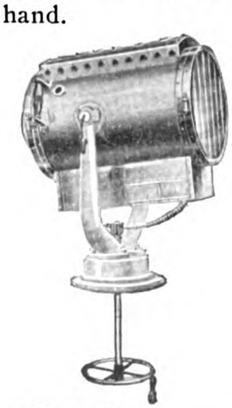
The Carlisle & Finch Searchlights are made in all sizes, from 7 inches diameter to 60 inches diameter, and with various styles of gear for controlling the direction of the beam of light.

The illustration here shows the plain type of searchlight arranged to be operated by hand from the deck.

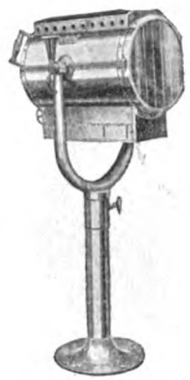


The next two illustrations show the type of steering gear when the Searchlight is mounted on top of the pilot house of the vessel with the hand wheels within easy reach of the hand.

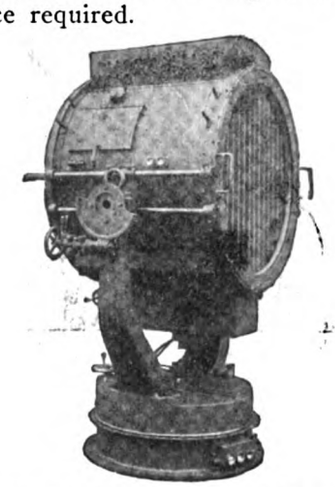




The deck type stand Searchlight is shown in the next illustration. These stands are made of various heights above the deck to suit the individual needs in each case where they are used. They are directed by hand.



The next illustration is from a projector made for the United States Navy. These are manufactured in the larger sizes equipped with all the refinements of construction required in that service. The horizontal and vertical movements are sometimes controlled by electrical motors in the projector base and the controlling levers placed at any distance required.



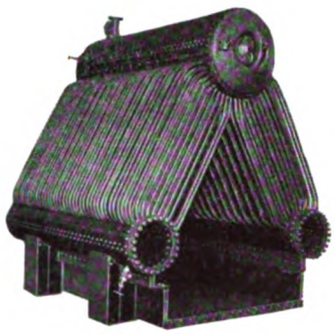
The factory of the Carlisle & Finch Co. is located at Cincinnati, Ohio, and is well equipped for manufacturing all lines of Searchlight Projectors.

RECENT ECKLIFF INSTALLATIONS.

Eckliff Automatic Boiler Circulators have recently been installed in the boiler of the tug 'A. B. Carpenter," owned by the Northwestern Fisheries, Seattle, Wash., also the tug "H. A. Baxter," of the Coastwise Dredging Company, New York City. Eckliff Circulators were also installed in the Scotch boiler of the tug "Vidette," Corps of Army Engineers, War Department, Philadelphia District; have also been ordered for six new ships building for the Coastwise Transportation Co. of Boston at New York Shipbuilding Company. Eckliff Circulators have also been incorporated in the specifications for the new lighthouse tender

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SCOTT PATENT WATER TUBE BOILER



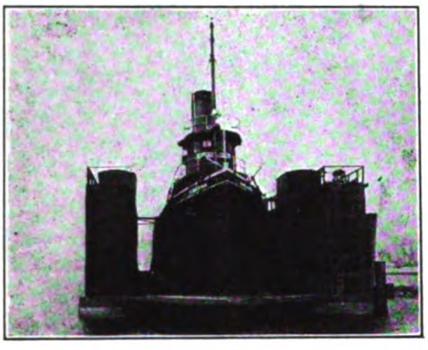
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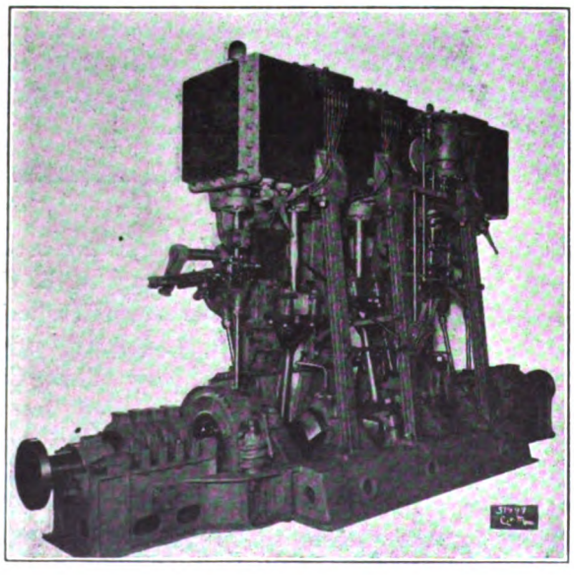
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"Cedar," and bids are now being received by the Bureau of Lighthouses covering the construction of this vessel. The boilers of the U. S. Coastguard Cutter "Seneca" have been equipped with Eckliff Circulators, and it is well to mention that since Eckliff Circulators were installed the bottoms of these boilers have been covered to retain the heat units that exist in that area. An order has also been received from W. E. Meyer & Co., St. George, Bermuda, covering the installation of circulators in their steam tug "Gladisfen." On the Great Lakes, Eckliff systems have been installed in the four boilers of the steamer "Eastland," operating between Chicago and St. Joseph, also in the four boilers of the steamer "City of Benton Harbor" of the Graham & Morton Transportation Company, operating between Chicago and Benton Harbor. They have also been installed in the boiler of the tug "Wau Bun" of the Great Lakes Dredge & Dock Co., Milwaukee Division; in the dredge "No. 9" of the Great Lakes Dredge & Dock Company, Toledo Division. The boilers of the U. S. Army dredge "Burton" of the Cleveland District Corps of Army Engineers, War Department, have recently received Eckliff equipment, as have steam tugs "Tavernilla" and "Gorgona," recently completed at the Staten Island Shipbuilding Company for the Isthmian Canal Commission. The boilers of the steamer "A. W. Thompson," W. H. Becker, Cleveland, manager, are now receiving Eckliff equipment at Duluth, Minn. The tug "David Gibb," of the North State Lumber Company, Charleston, S. C., and the Milwaukee, Wis., Fire Tug "No. 29" are also listed among the recent Eckliff installations.

Among the recent sales of Bolinder engines are numbered one 320 horsepower engine for the Standard Oil Company and eleven smaller units for the same concern, all being for barge service on New York bay. Six units for direct driven electric light sets for the United States Navy. Two 320 horsepower stationary units for the Butters Mining Company for Mexican mine use.

Mr. Frank Walker, marine surveyor, consulting engineer and naval architect, Seattle agent for the American Engineering Company, the Welin Marine Equipment Company and the Submarine Signal Company, has removed his offices to 211-213 in the Grand Trunk Pacific Dock, Seattle.

Charles M. Schwab, president of the Bethlehem Steel Company, accompanied by a party of Eastern capitalists and steel manufacturers, spent a week in San Francisco during the early part of the month inspecting his business interests here.

Calvin W. Rice, secretary of the American Society of Mechanical Engineers, is in town. Mr. Rice is serving on one of the numerous award juries at the Exposition.

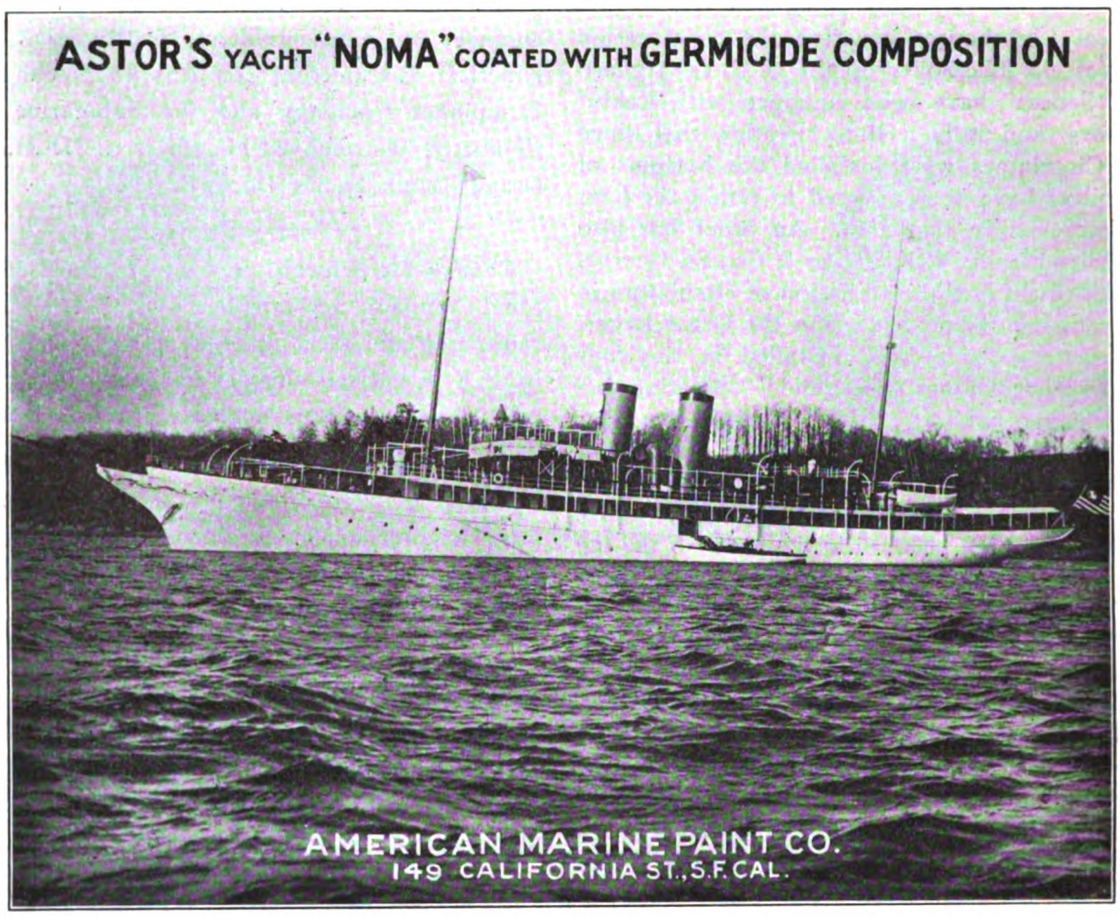
Mr. E. C. Ward, who has been acting as temporary manager of the Pacific Coast Steamship Company since the retirement of Mr. Geo. H. Higbee, has been elected Vice-President of the big coast steamship concern.

The McCormick steamer "Wapama," recently finished at the St. Helens Shipbuilding Company, is now in regular service, the Main Street Iron Works, of San Francisco, having installed her engines in very fast time.

Mare Island Navy Yard has been authorized to construct a duplicate fuel ship to the "Kanawha" at a cost of $993,000. Work will not commence on the new tanker, which is to be named the "Cuyama," until after the launch of the two torpedo boat destroyers now under way.



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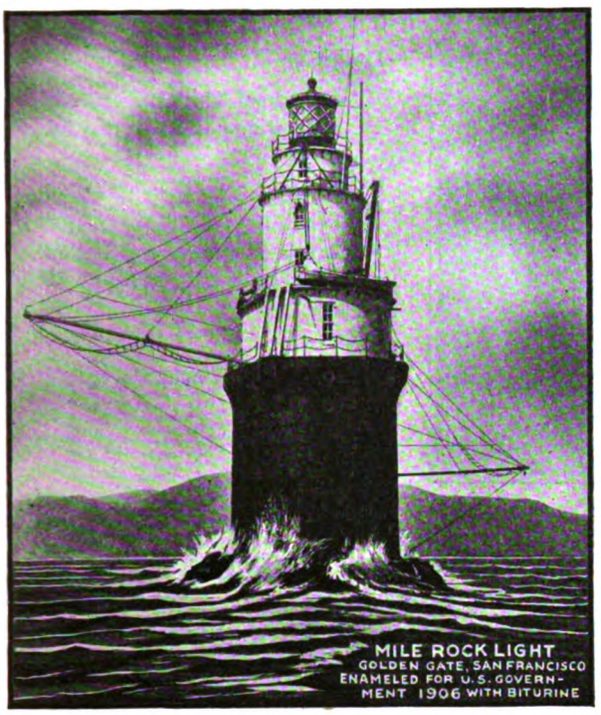
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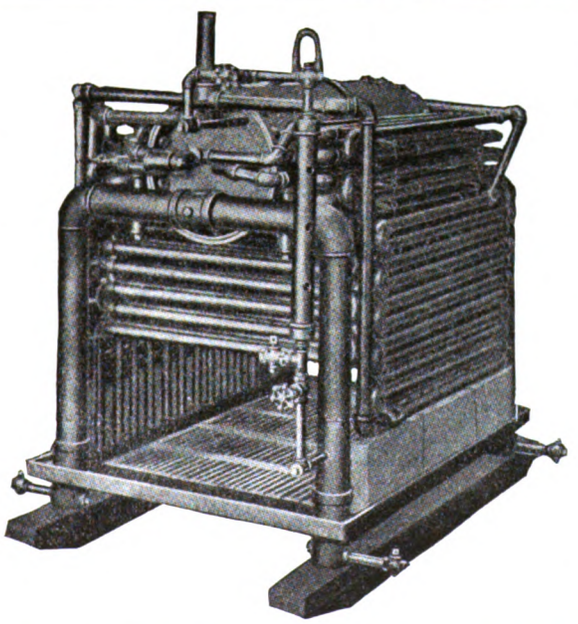
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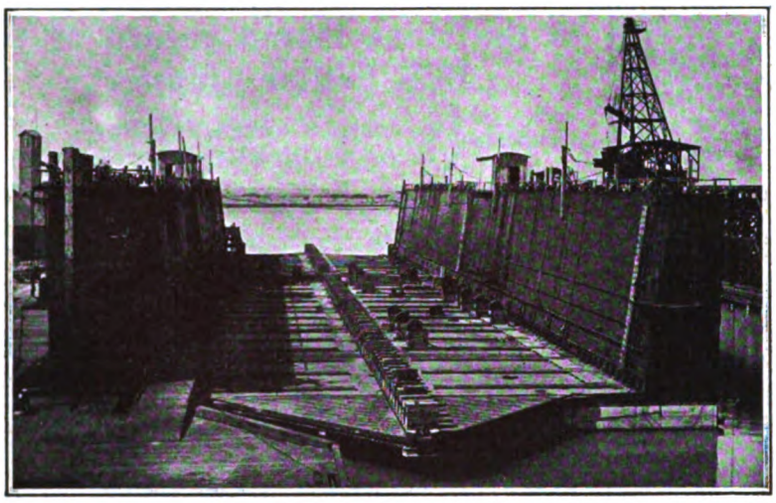
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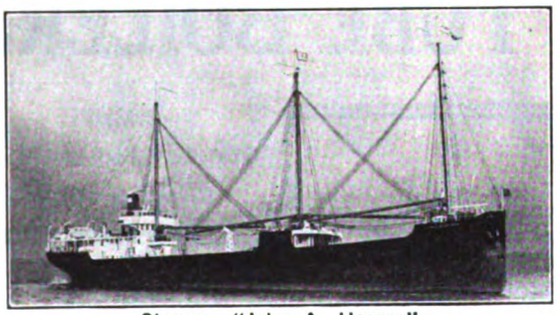
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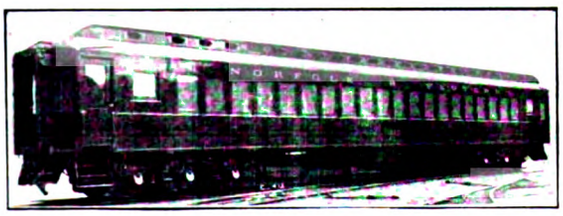
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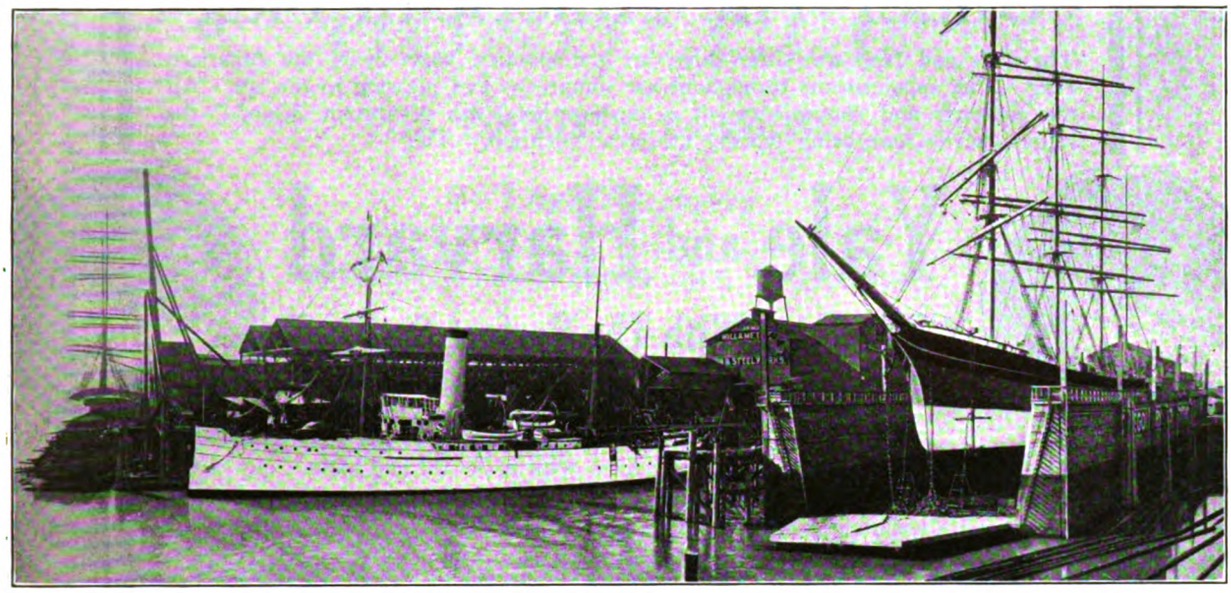
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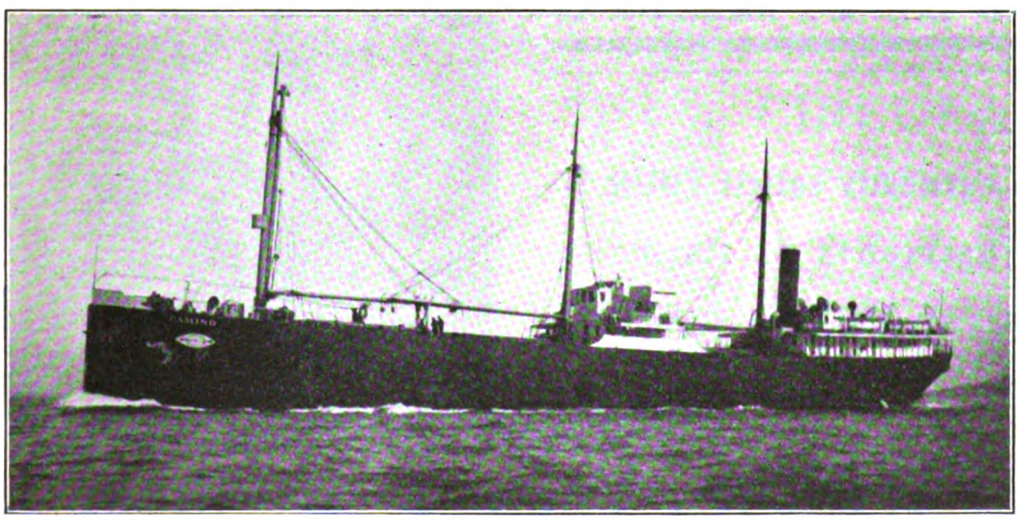
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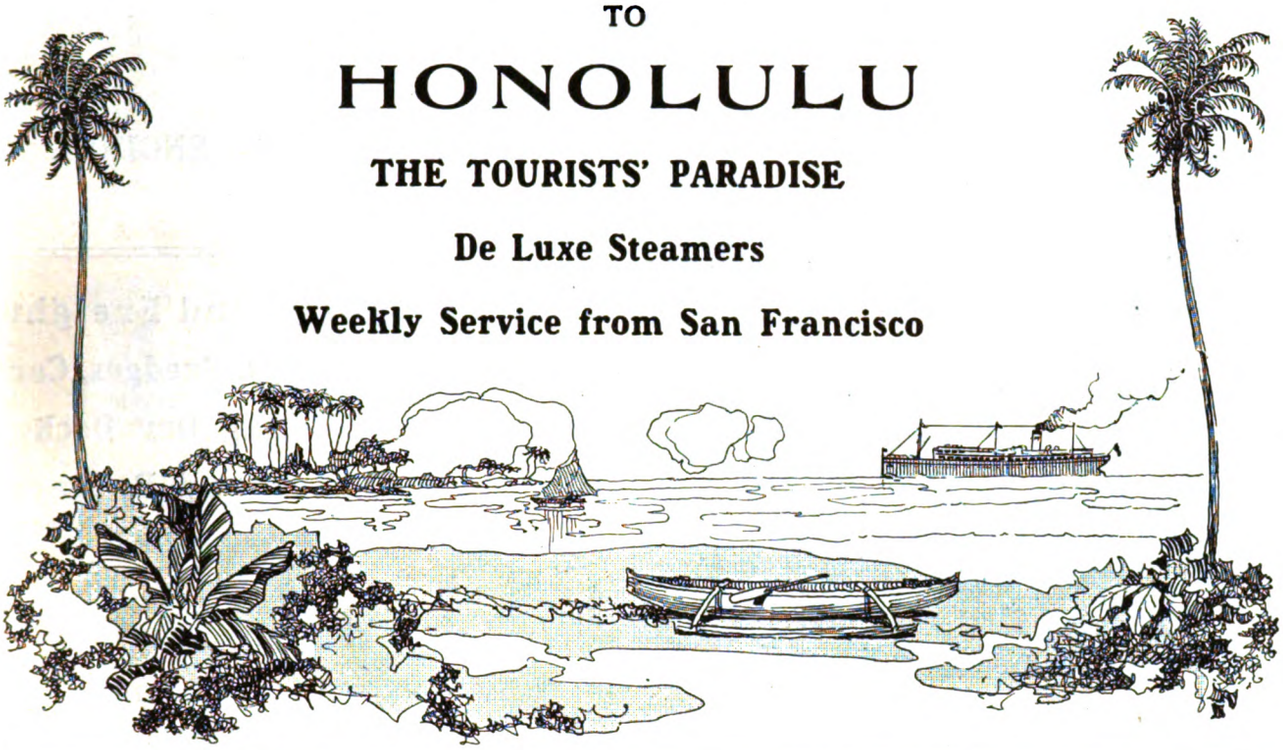
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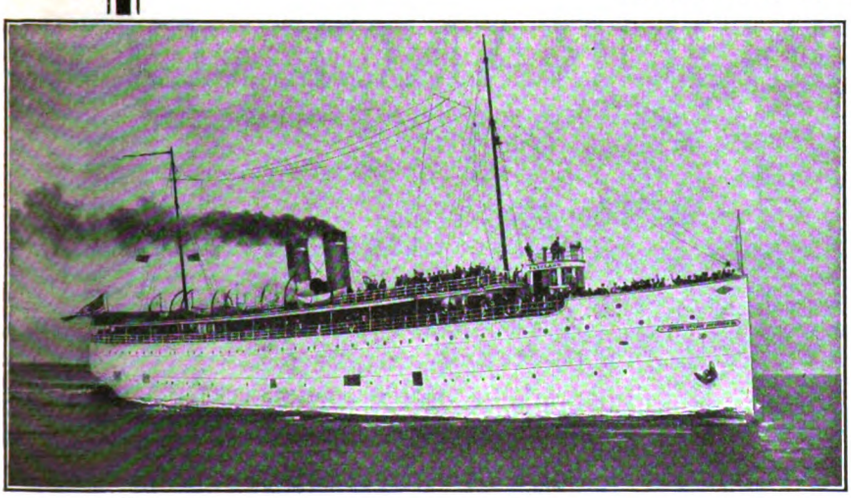
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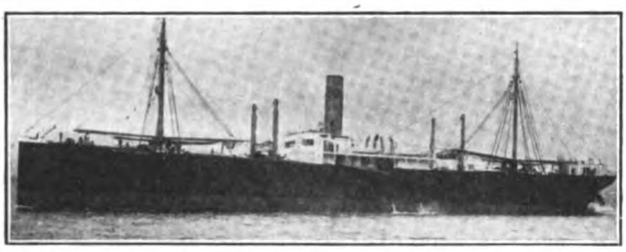
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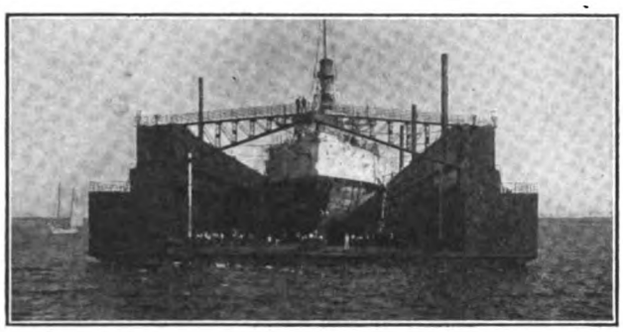
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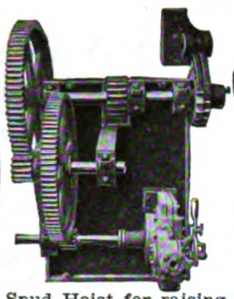
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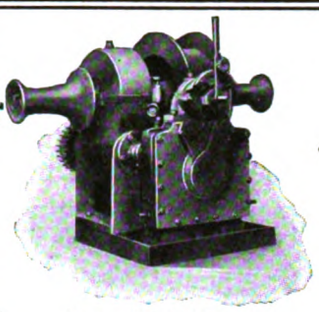
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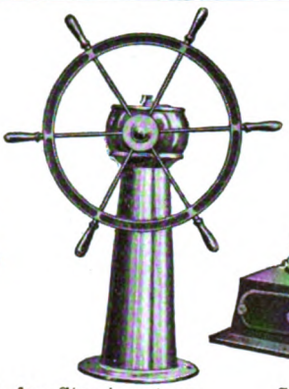
Single Wheel Steam Steering Gear



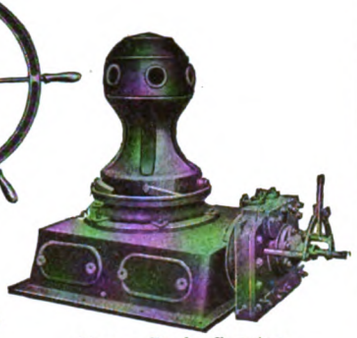
Spud Hoist for raising and lowering spuds on dredges



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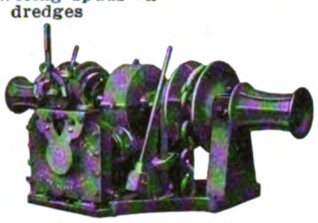


Standard for Steering from top of Pilot House

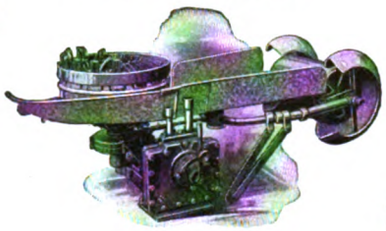


Steam Deck Capstan





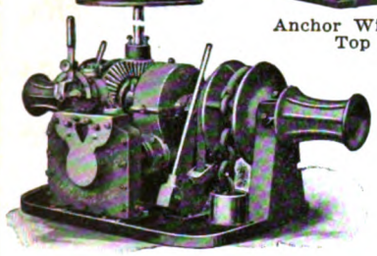
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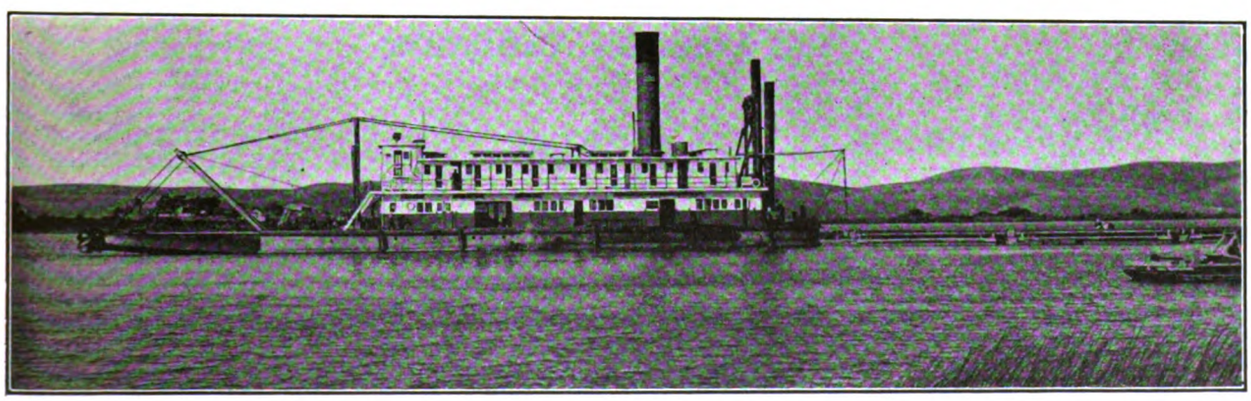
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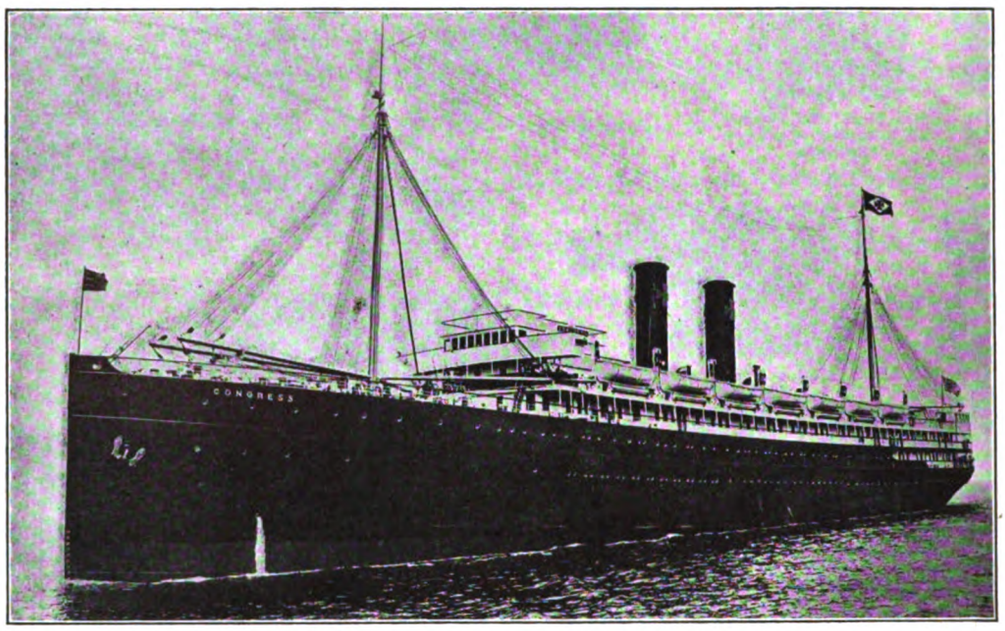
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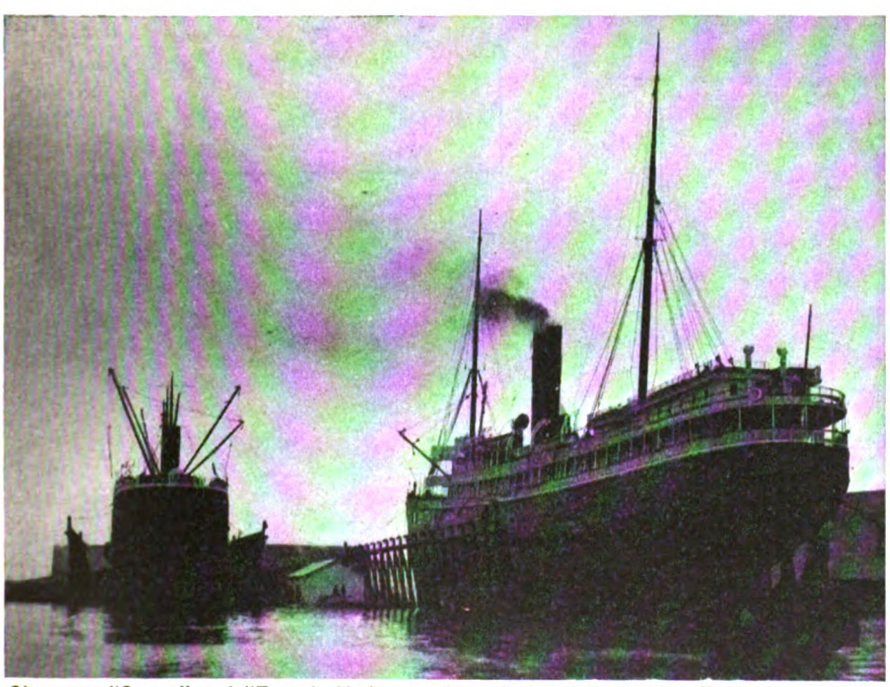
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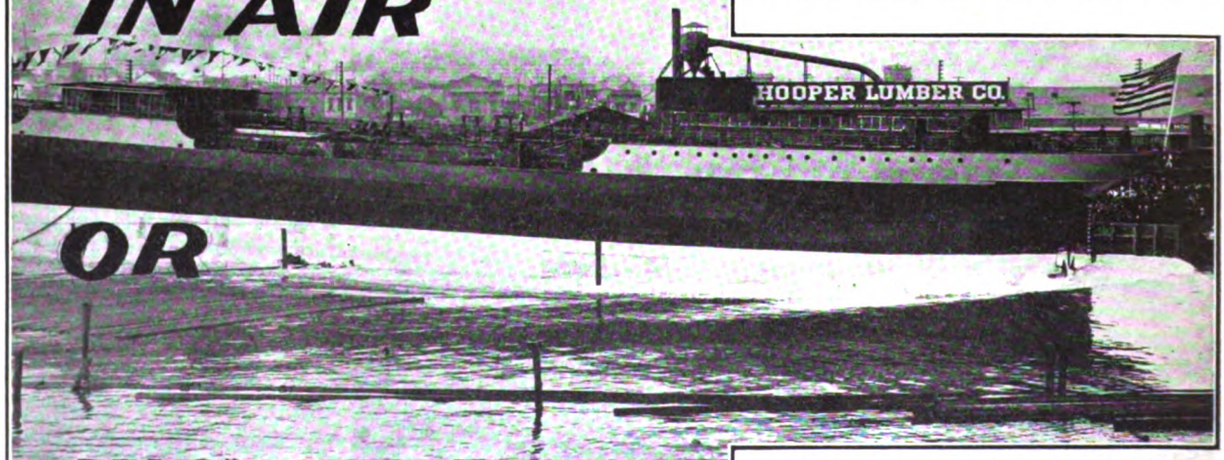
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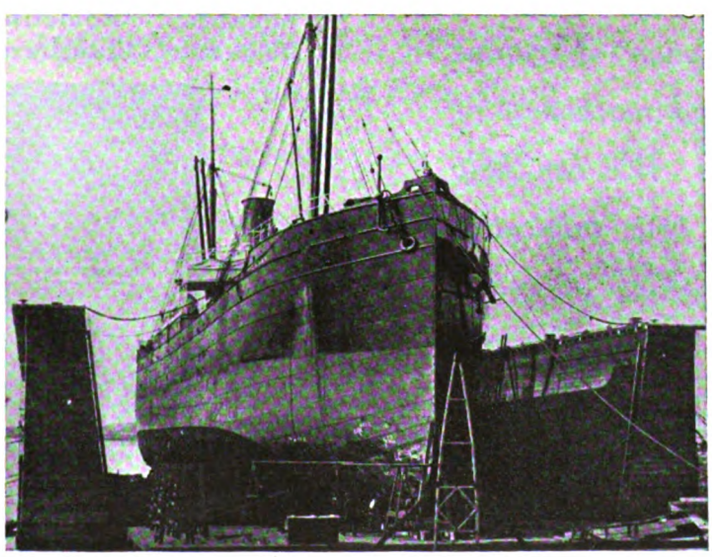
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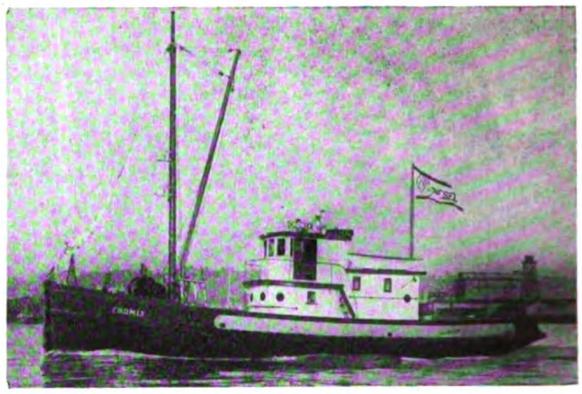


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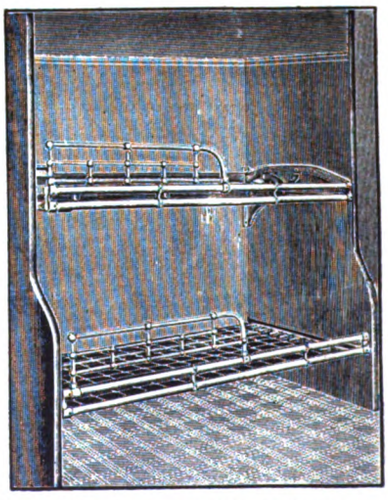
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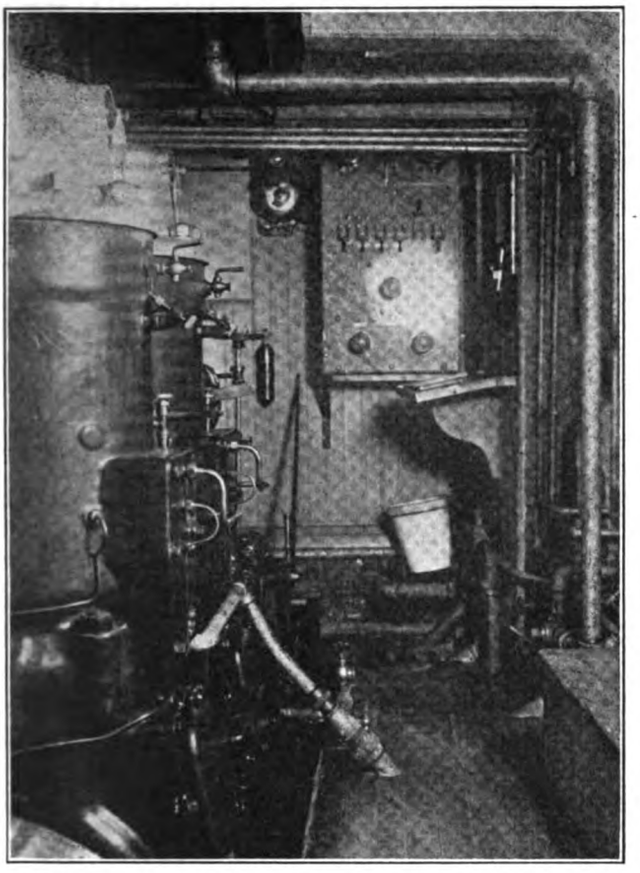
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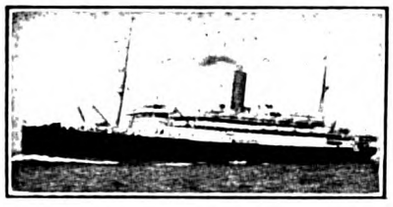
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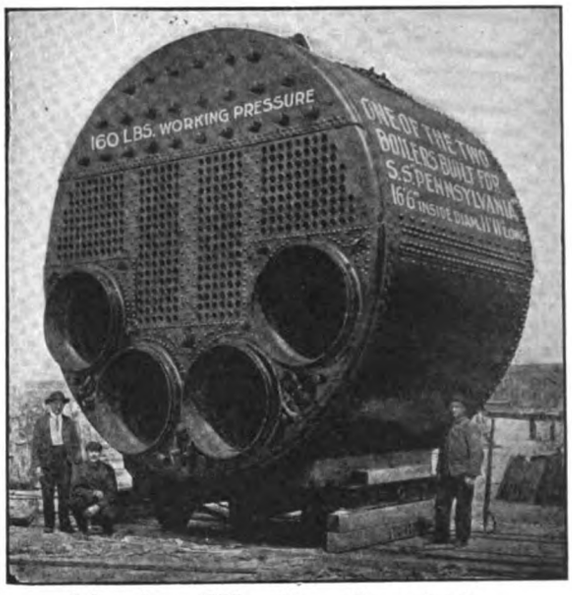
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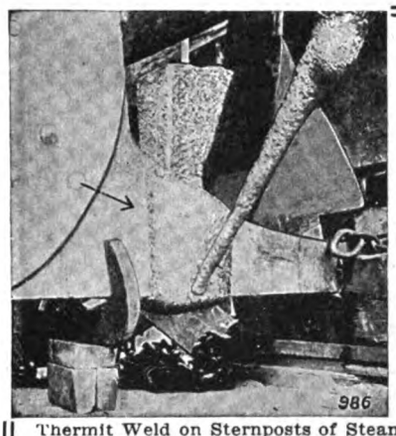
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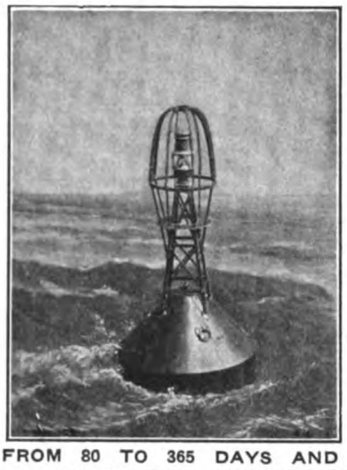
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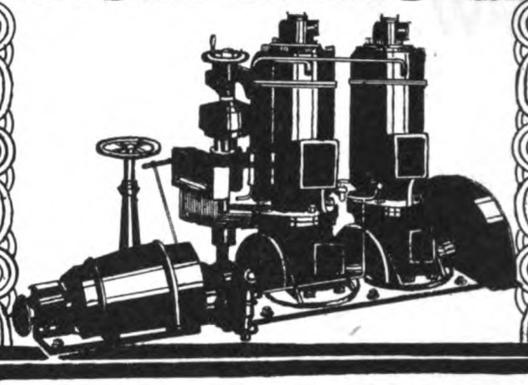
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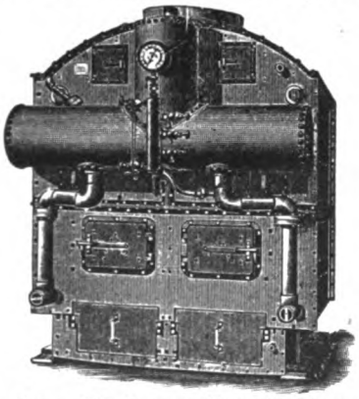
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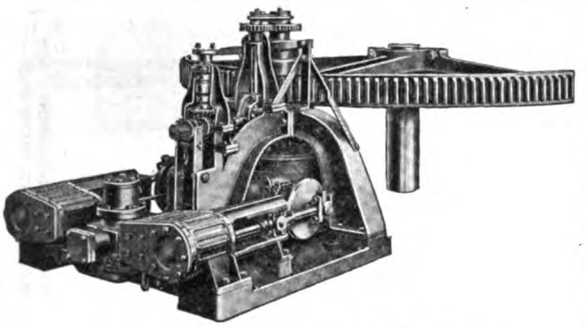
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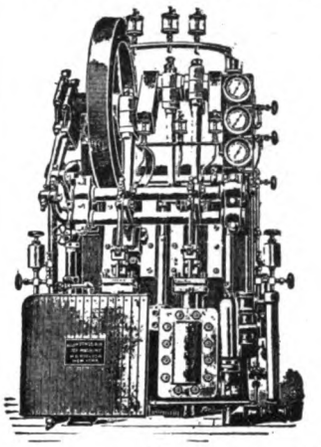
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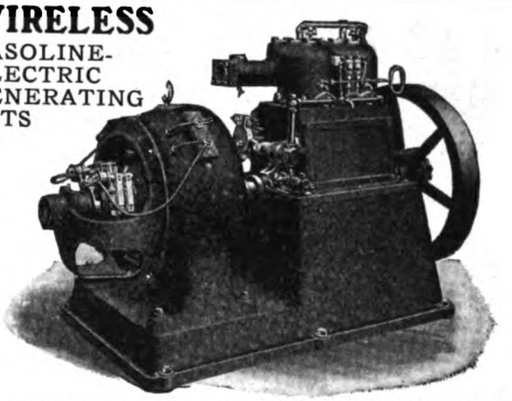
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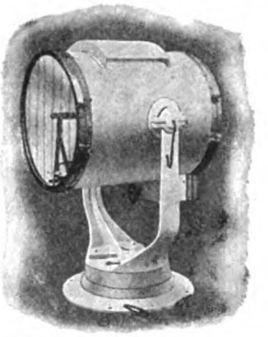
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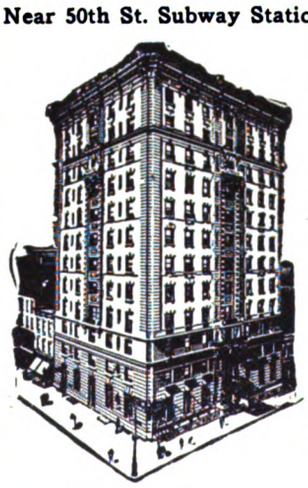
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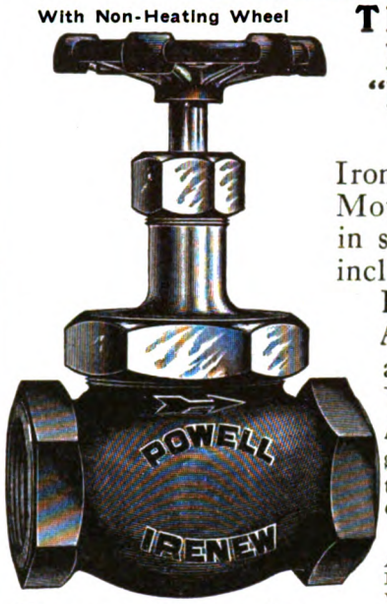
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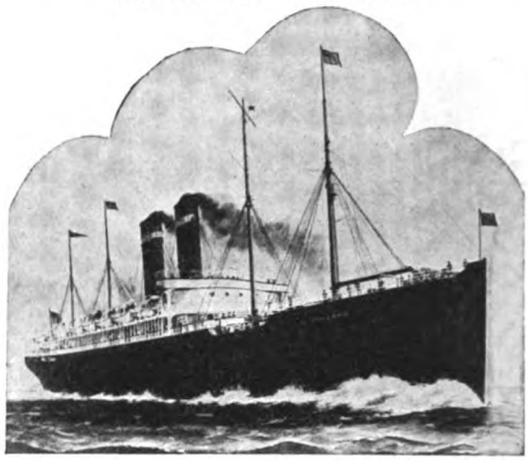
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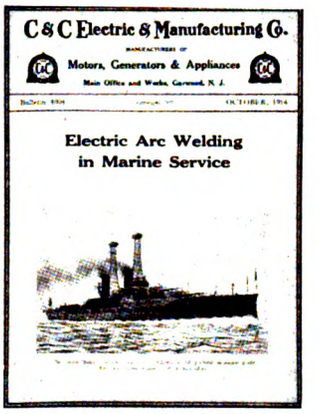
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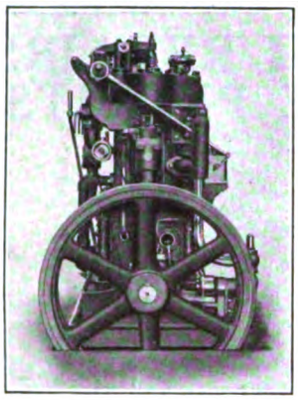
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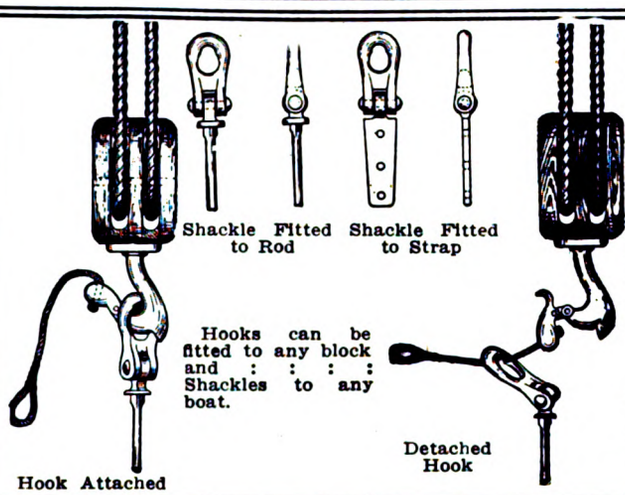
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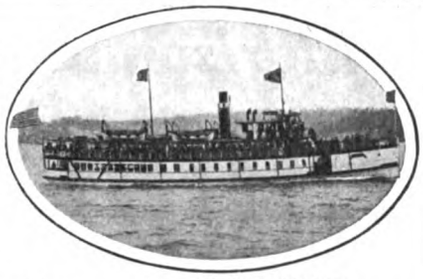
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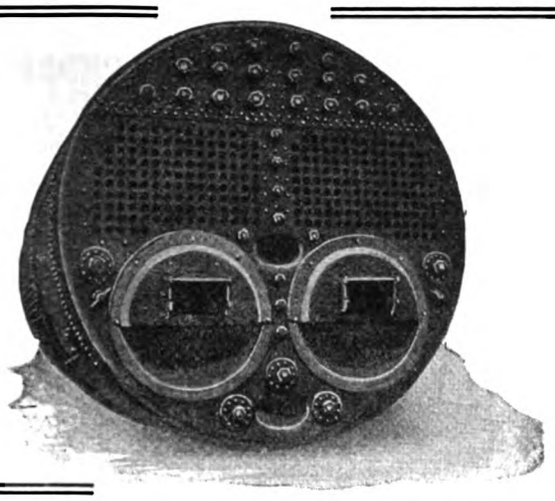
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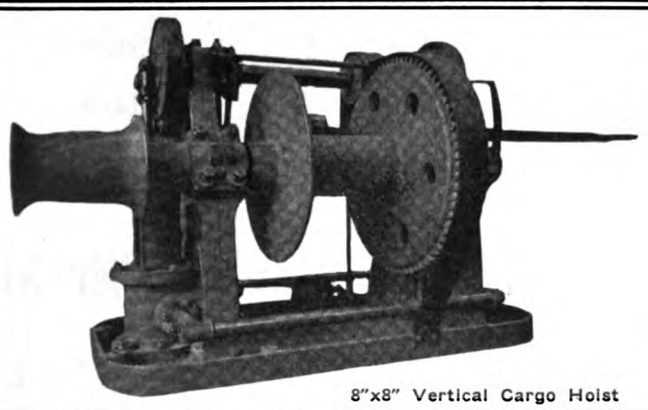


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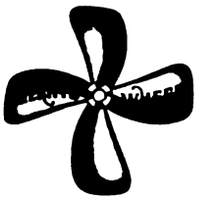
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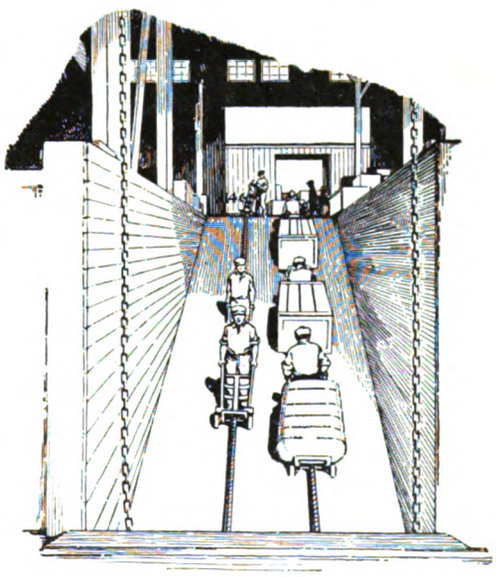
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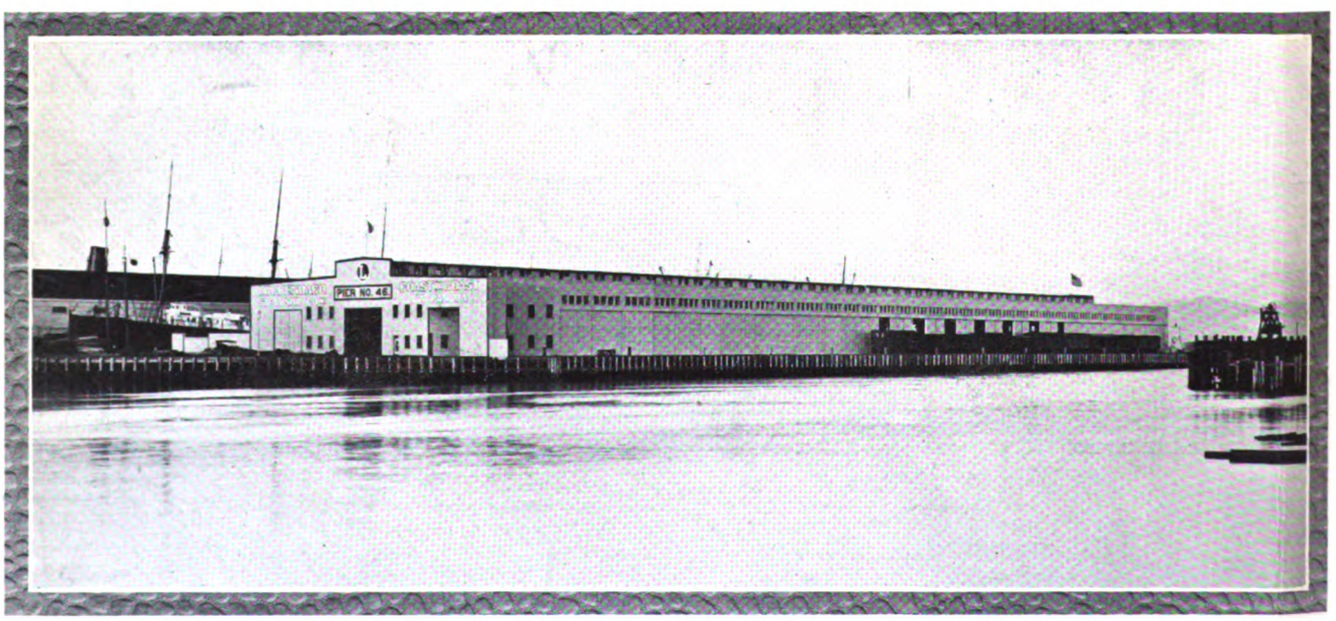
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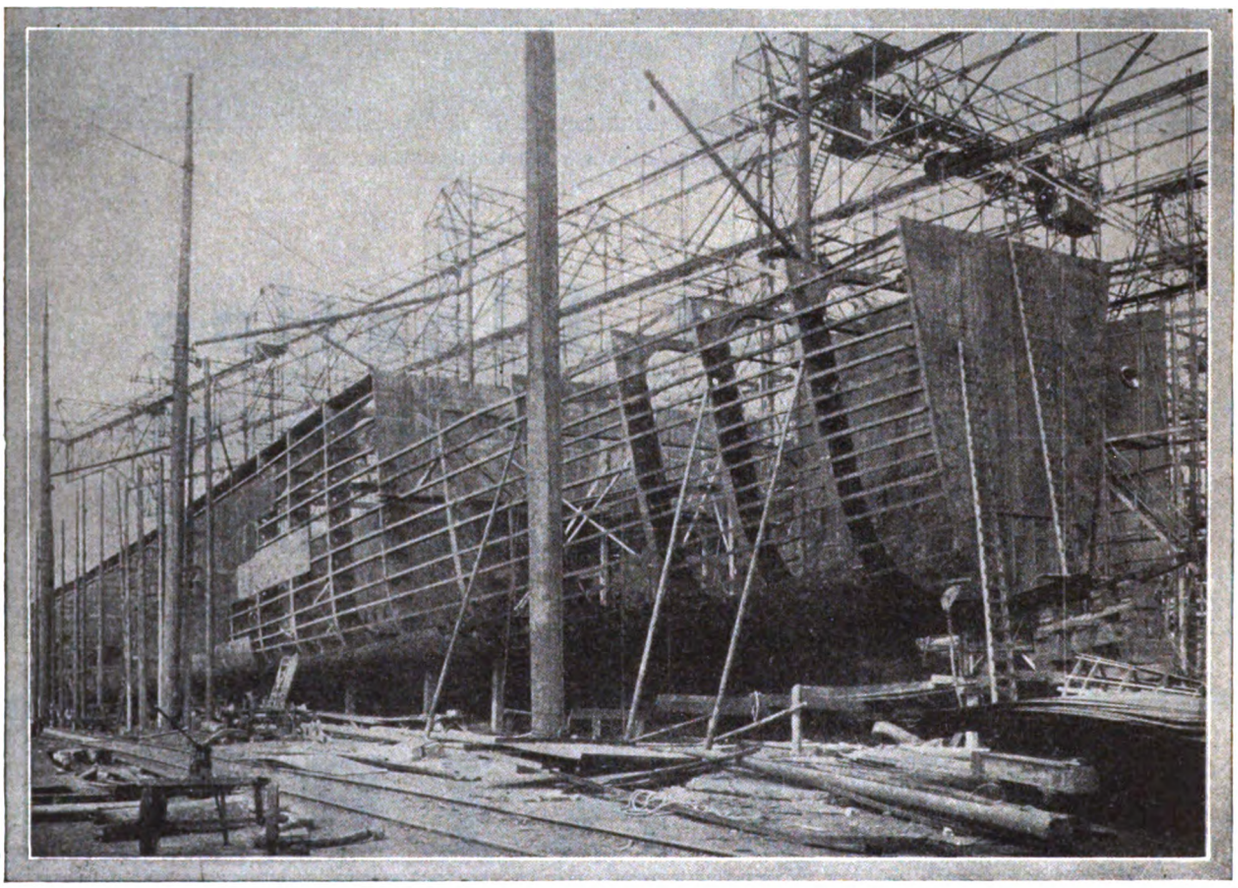
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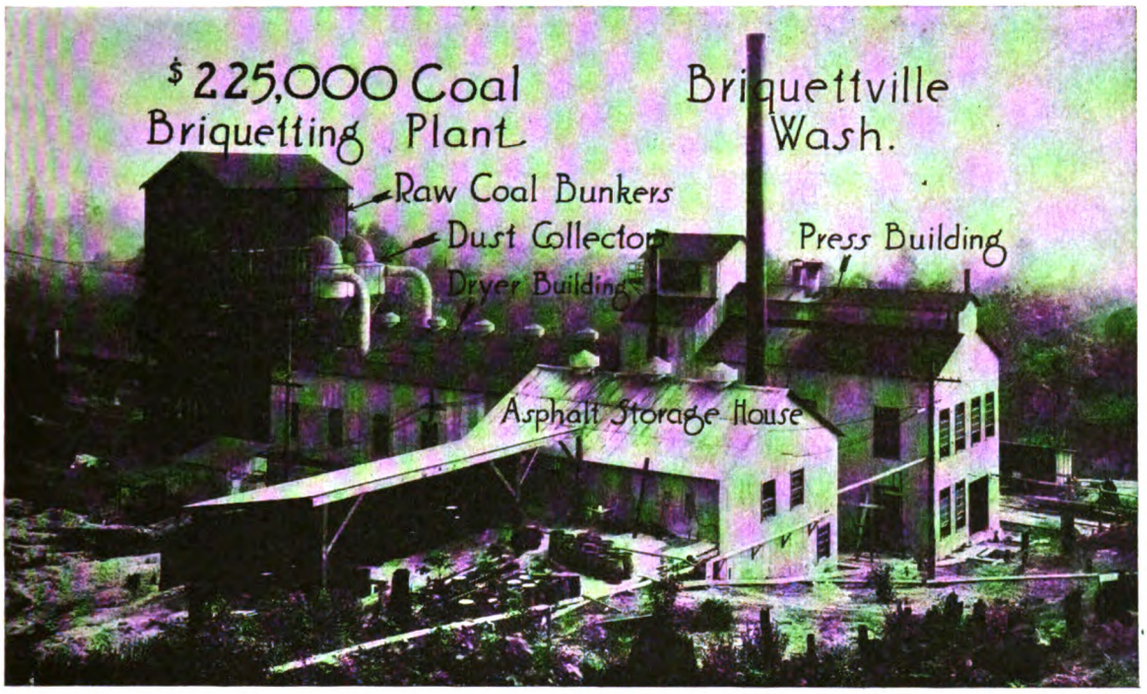
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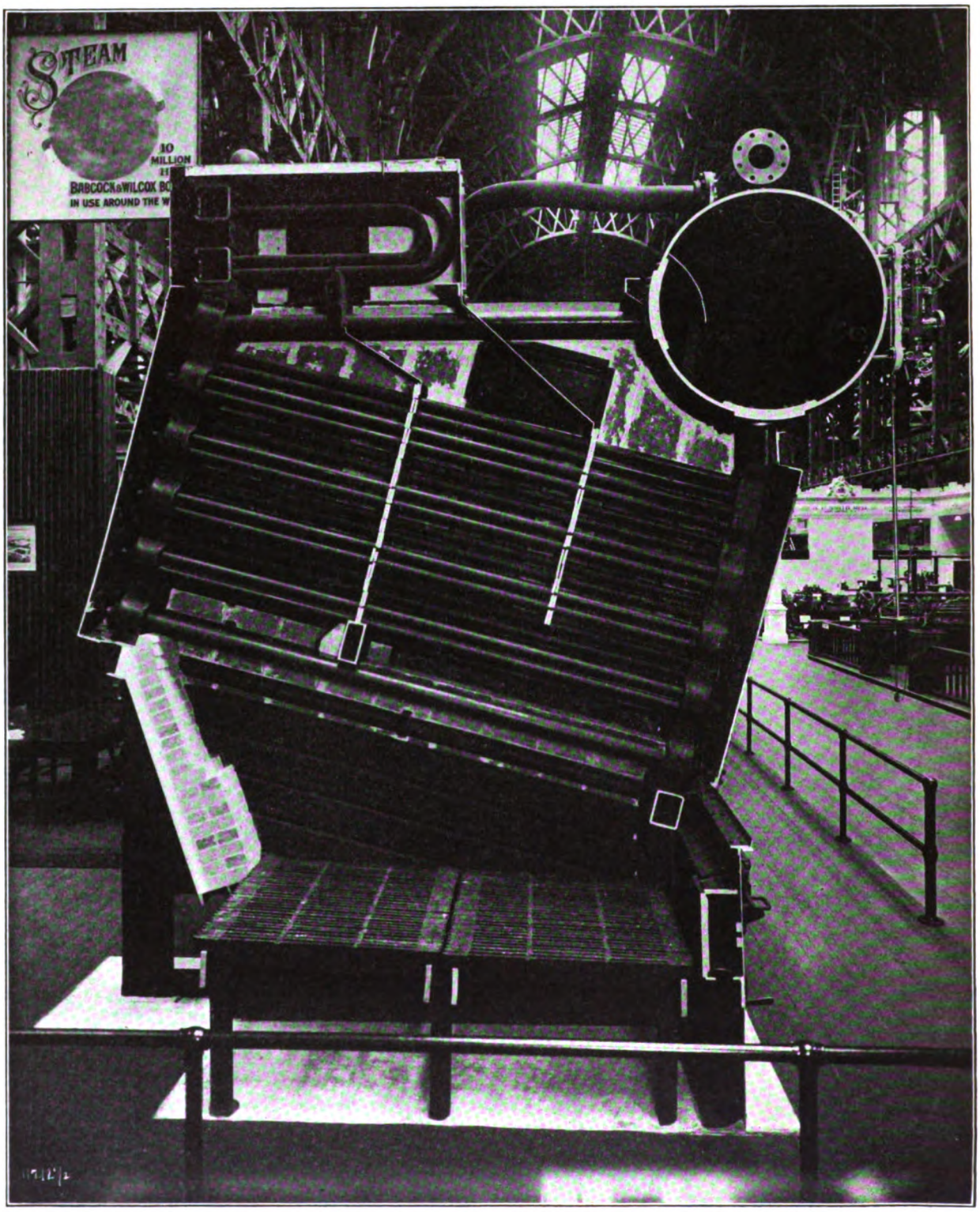
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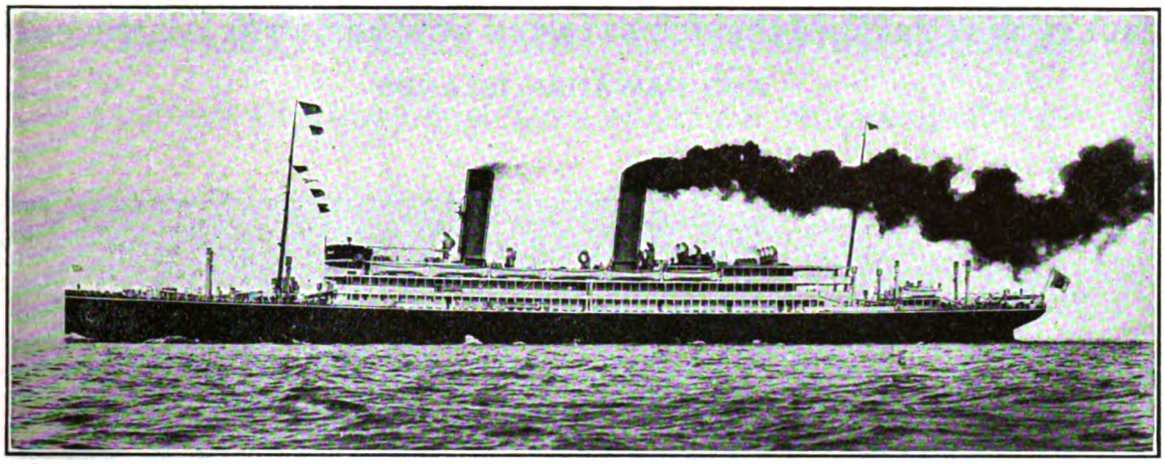
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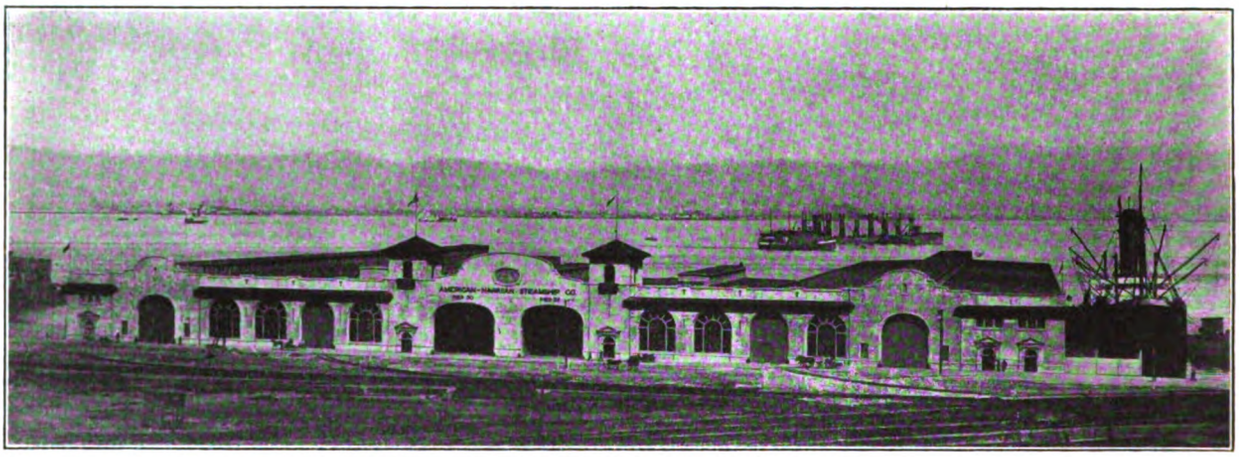
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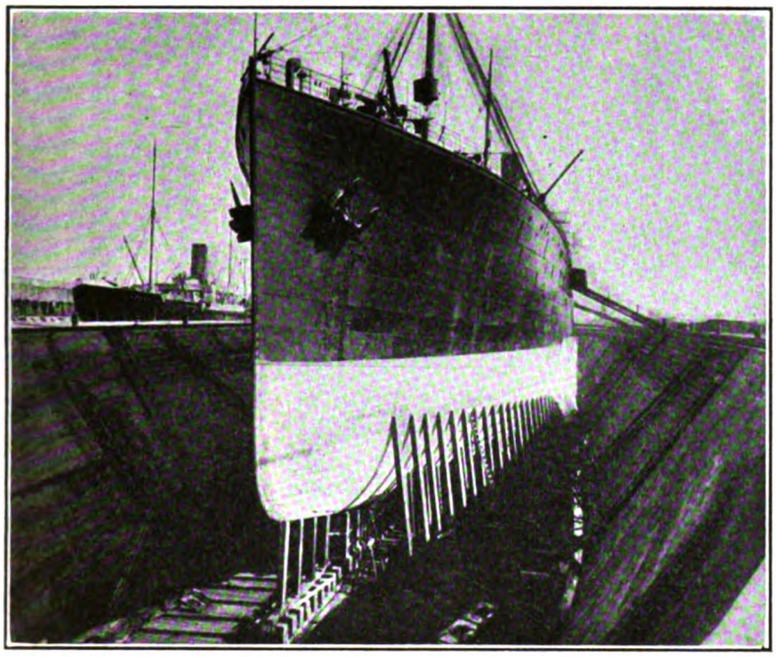
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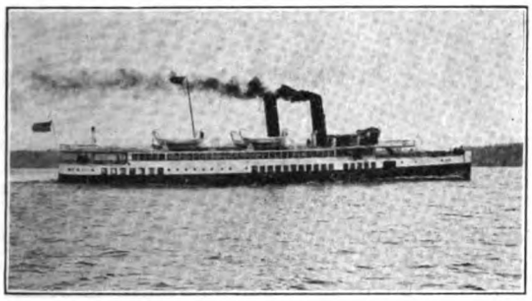
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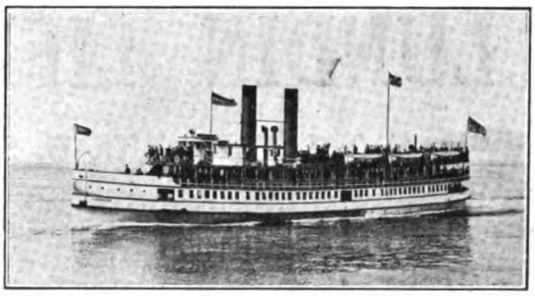
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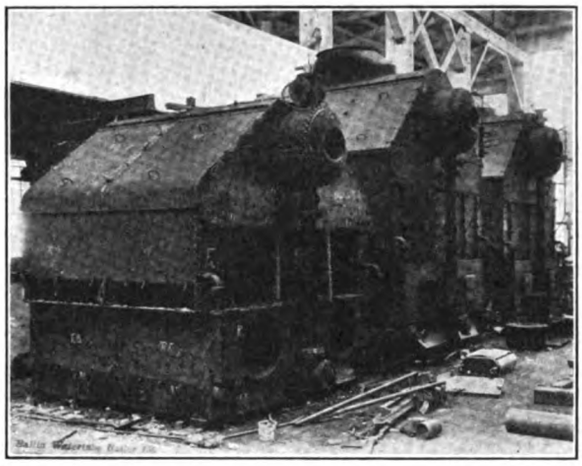
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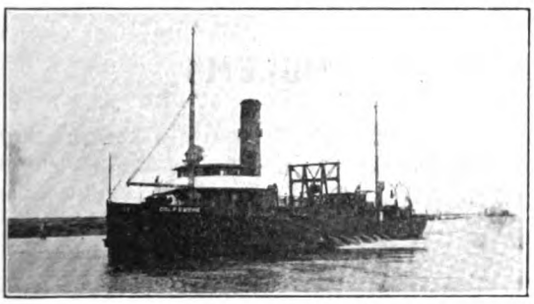


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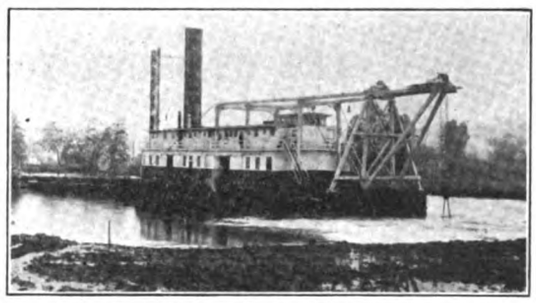
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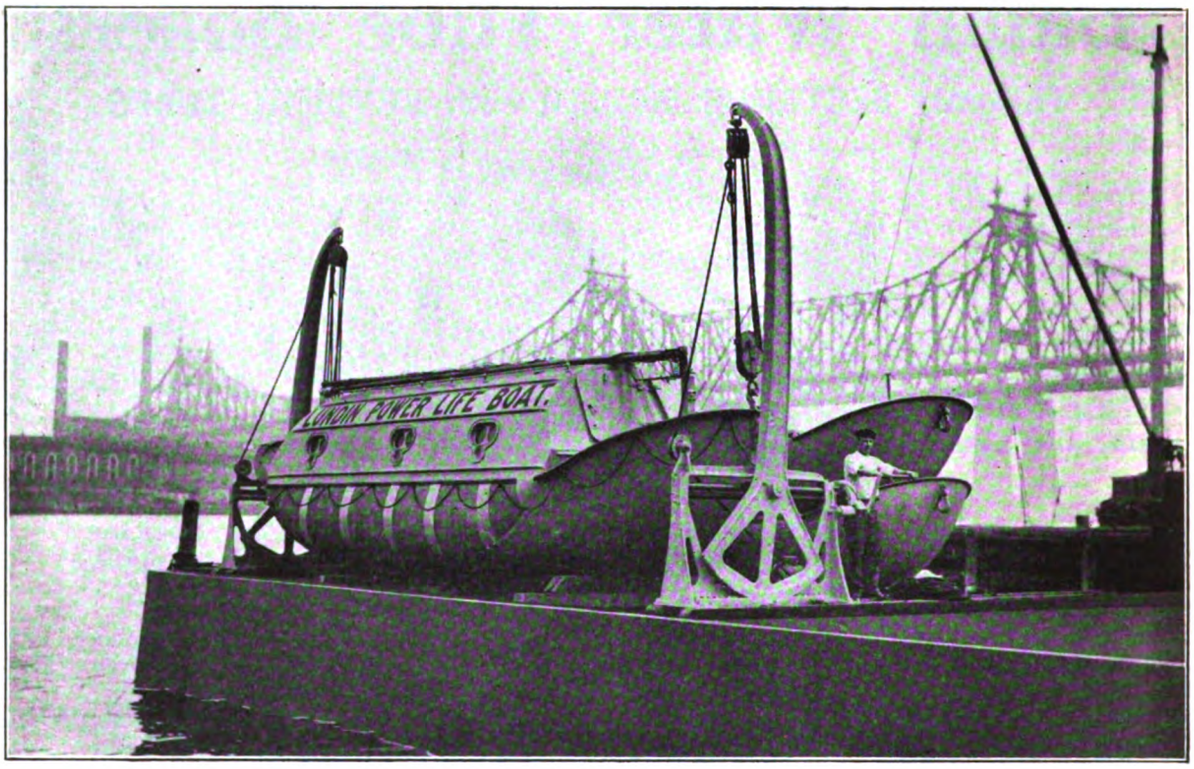
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PACIFIC MARINE REVIEW

LARGEST SHIPPING PAPER PUBLISHED IN THE UNITED STATES.

VOL. XII, NO. 7. SAN FRANCISCO JULY, 1915.

The Dalles-Celilo Canal

THE last barrier to the free navigation of the Columbia and Snake rivers was swept aside when the Dalles-Celilo canal was formerly opened with a week of festivities, beginning on May 3. The great Inland Empire of the Northwest has heretofore been cut off from the Pacific Ocean by natural barriers, consisting of rapids and falls on the Columbia river. The completing of this canal between the towns of The Dalles and Celilo provides a natural passageway around the last of these barriers, does away with the necessity of transshipment by rail, and renders possible water transportation by the usual type of river steamer from the upper Columbia basin to Astoria.

To the man who understands the importance of the Columbia river in the transportation development of the Northwest, the opening of The Dalles-Celilo canal holds as great a significance as did the opening of the Panama Canal. The new waterway is on the Oregon side of the Columbia, which it parallels for eight and one-half miles. In conjunction with the locks on the Willamette river there is now open to navigation one thousand miles on the Columbia and Snake and 220 miles on the river that traverses Oregon's great western valley. The project has been carried out by direct government appropriations under the river and harbors' bill and work was commenced in 1908. The cost of the work was in the neighborhood of $5,000,000 and the minimum depth of water in the canal is eight feet.

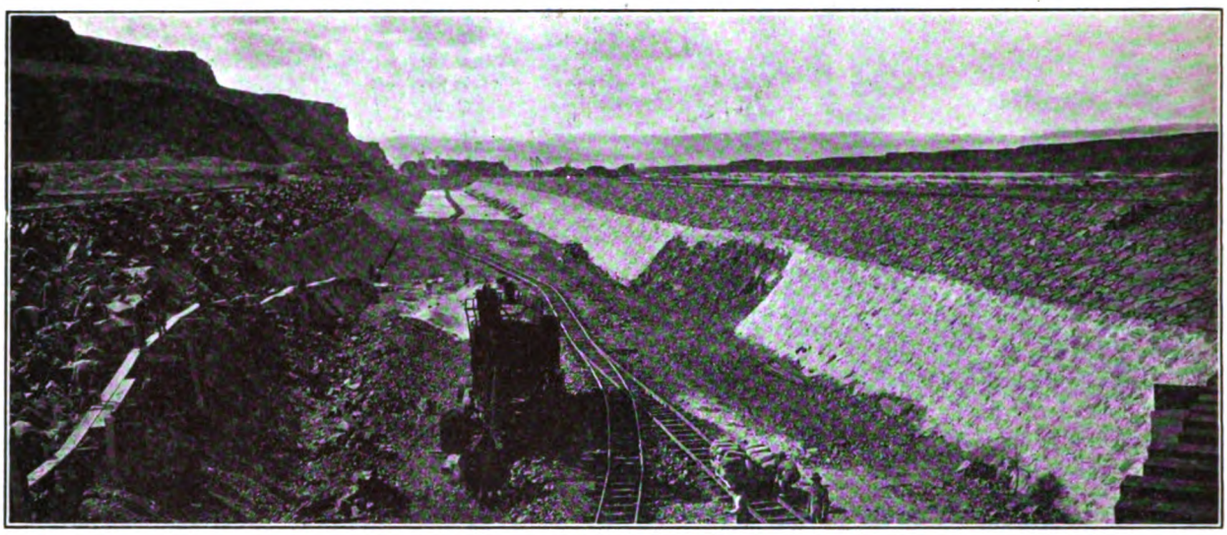
Construction.

The actual construction of the canal has been carried on by the United States Government with hired labor, save for a four thousand foot stretch at the upper end, which was let out at contract. The work was done under the supervision of the army engineer in charge of the first (Portland, Oregon) district, with other army officers in actual charge of the field work. Lieutenant Colonel Jay J. Morrow was the supervising engineer in charge, with Captain H. H. Roberts on the ground at the canal from 1910 to May, 1913, and Captain T. H. Dillon from that time to the completion of the work. The canal is of the lock type and drilled out of solid rock for half its length, and, where cut through sand or gravel, is lined with concrete. The principal of the five locks is located at Big Eddy, above The Dalles, where three gates serve to form tandem locks with a combined lift of seventy feet, the total normal raise in the length of the canal being ninety feet. The other locks are at Celilo Falls, Ten Mile Rapids and Five Mile Rapids. One pair of locks is used principally to regulate the stage of water in the canal. The usable dimensions of the locks are, length, three hundred feet; width, forty-five feet and depth of water over sills, seven feet. During construction, eight steam shovels, twenty-two locomotives, two hundred flat and dump cars, five concrete mixing machines and fifty miles of construction track were used. The largest number of men employed at any one time was 1500. The following figures give an idea of the amount of material used or handled during the building of the canal: Solid rock excavation for locks, 160,957 cubic yards; sub-aqueous excavation, 3,000 cubic yards; solid rock excavation for canal trunk, 810,156 cubic yards; common dry excavation, 504,871 cubic yards; sand excavation, 536,267 cubic yards; concrete and rubble masonry, 96,744 cubic yards; 1,000 feet overhaul, 532,777 cubic yards; reinforced concrete, 52,536 cubic yards. 2709 lineal feet of shafts, tunnels and filling ports were bored and about 3,000,000 pounds of metal was used for gates and lock work.

Operation.

The canal requires an operating force of about twenty-five men to care for the nine steel swing

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Celilo Canal west of ten-mile locks, showing concrete and rock construction.

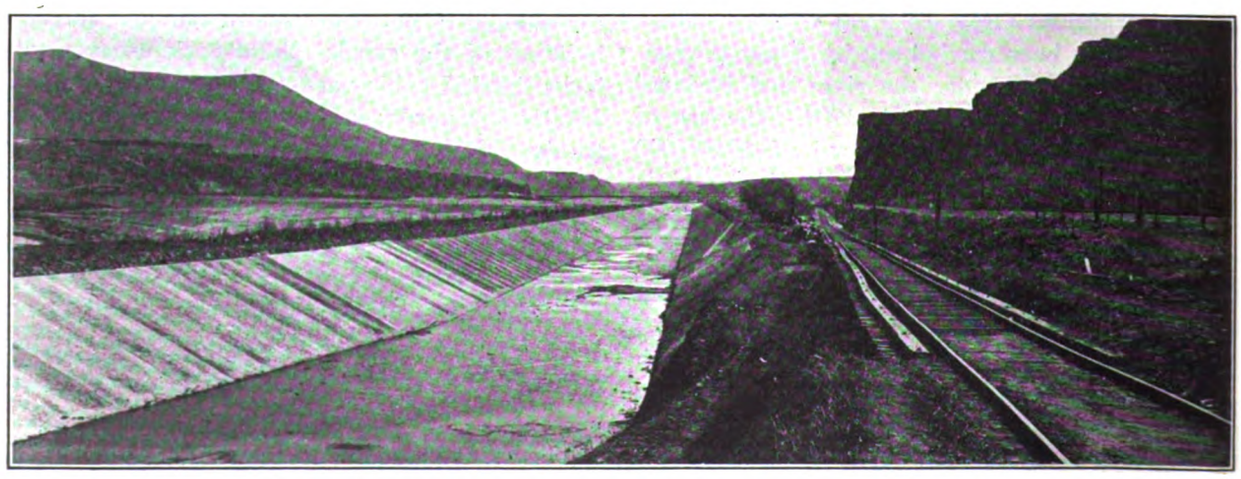
bridges which cross the project at various points and to operate the machinery for opening or closing the lock gates. Eight passing basins have been provided to facilitate the movement of craft through the new waterway and it is expected that the passage will be made with little difficulty except at extreme high water.

History.

The first white men to traverse the section of the Columbia in the vicinity of the new canal were Lewis and Clark and their companions who came by way of Lewiston, Idaho, in 1805. The first shipment of freight across The Dalles-Celilo portage was begun in August, 1811, and consisted of supplies belonging to the Pacific Fur Company of New York, of which John Jacob Astor was the senior partner. In 1813 a yearly "express" began to use this route from Vancouver to Fort Williams and Montreal, making the trip in March and returning in October with mails from New York, Boston and England. Up as late as 1855 the annual pilgrimage of fur traders from the great Inland Empire passed down the Columbia to Astoria. In 1836 the missionary became active in the northwest and made use of the Dalles portage. In 1853, Wasco County was formed and included all the territory in Oregon east of the Cascades. Its population was 35 white people, number of Indians not known. From 1859 to 1862 occurred a great gold rush to the Nez Perces Mines, and this served to start a serious trend of population into the back country that lay beyond the Dalles. Naturally the gradual development of the country back of the Dalles called for the development of river transportation both above and below this great obstruction and also above the second great barrier, the Cascades.

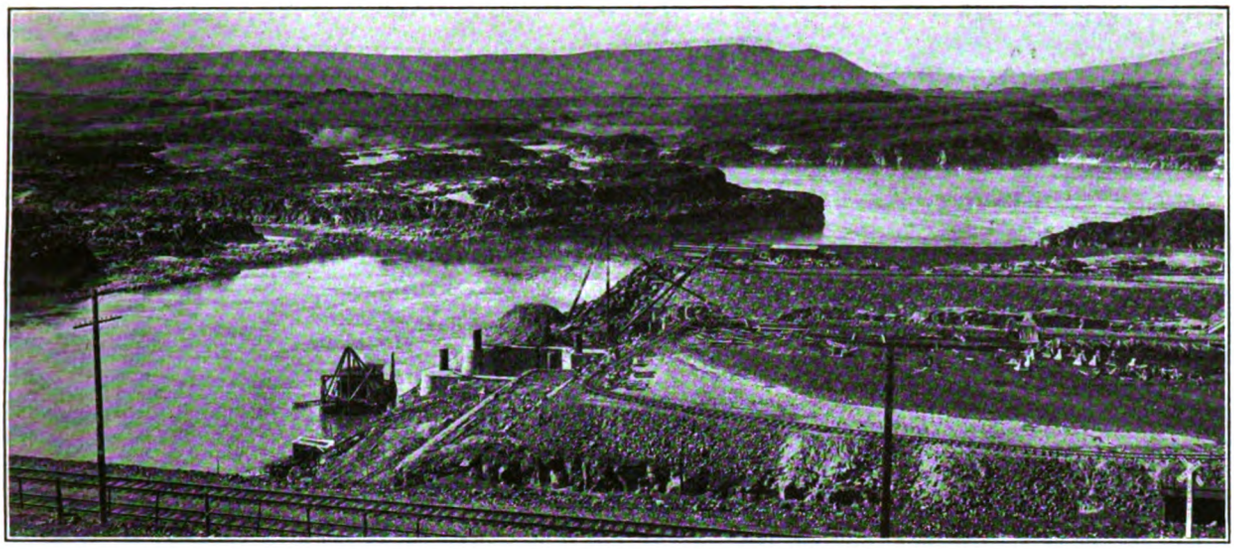
Steamboating.

The first steamboat to be operated on the Middle river, between the Cascades and the Dalles, was the "James P. Flint," built at the Cascades and put into commission in August, 1851. In January, 1852, this boat was taken through the Cascades and operated on the lower river. She was sunk during the same year, but was later raised and remodeled, her new name being the "Fashion." The next steamer on the Middle river was the "Allan," a small propeller boat used for towing

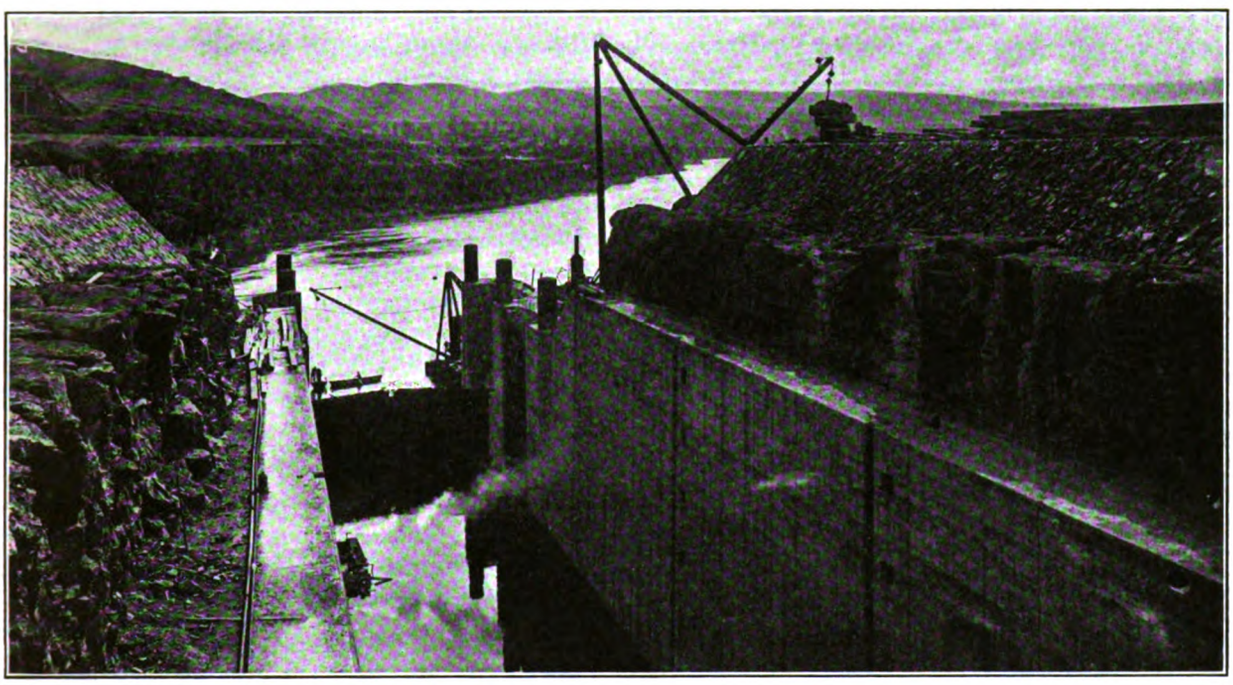


Long tangent on Celilo Canal east of ten-mile locks, concrete lining to cover sand deposit.

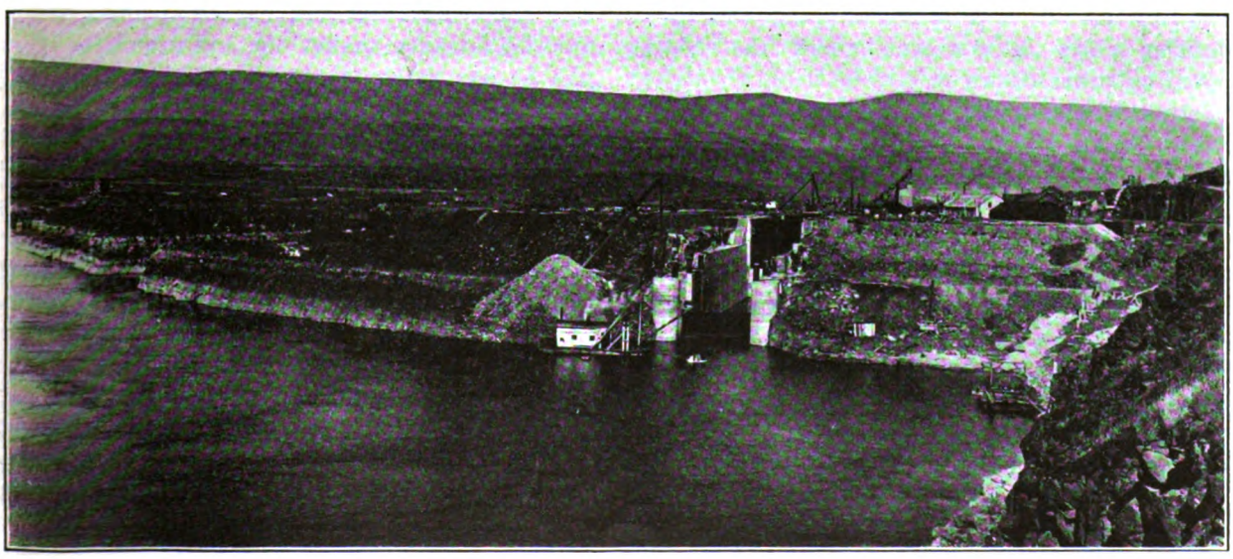
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Cross view of lower end of canal showing Big Eddy, into which boats emerge from the canal.



Lower end of canal showing tandem locks blasted from solid rock. Two locks at this point give a lift of seventy feet.



Looking into lower entrance of canal at Big Eddy.

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Great rock cut, 400,000 cubic yards of rock was removed from this section. This photograph gives some idea of the difficulties encountered and overcome.

barges. She was hauled up over the Cascade portage in 1853 and continued in business till 1856. She was followed by the "Mary," "Wasco" and "Hassalo," the only three boats to be operated on the Middle river prior to the appearance of the Oregon Steam Navigation Company. The only steamboat on the Upper river, prior to the entrance of this company, was the stern wheeler "Colonel Wright," which was launched at the mouth of the Des Chutes river and made her maiden trip in April, 1859.

During the rush to the mines, the Oregon Steam Navigation Company commenced to get a strong grip on the river traffic. This concern was incorporated in 1860 and their control lasted till 1879, when the company was bought out by Henry Villard. About twenty first-class steamboats, numerous warehouses, great supply depots and two railroads, one around the Dalles and the other around the Cascades, were all acquired out of the company's earnings. In 1867 the shipment of flour out of the inland empire commenced, and this marked the beginning of the building up of the agricultural resources of a mighty empire. The completion of railroad connections practically put an end to steamboating on the upper river, but the opening of the Dalles-Celilo canal is calculated to make the all water route once more a serious contender for the bulk freights of the big inland valleys, forests and ranges.

The Seamen's Bill and British Shipping

The following article from the pen of Robert Dollar appears in London "Fairplay." Eight months from date the Seamen's Bill will be in full swing as far as foreign shipping calling at American ports is concerned, and the course adopted by other countries will be keenly watched by both the friends and enemies of an American Foreign Trade Merchant Marine.

"The reason for the enactment of this law as stated by the Sailors' Union (who drafted it) was to raise the seamen's wages of the world. It will be conceded that this is rather a big undertaking even for the Congress of the United States. The principal features are first: It abolishes all advances except to near relatives, and even those are only valid who appear before the United States Shipping Commissioner. Coupled with this is the compelling of the captain on forty-eight hours' notice to pay the men half of their wages earned—note particularly it is not half their wages due. For example, a man ships on a British ship in England for a voyage to America and back. He gets an advance of one month's wages, and in two weeks he arrives in an American port and demands half the wages he has earned. This, with his month's advance, makes one and a quarter months' pay he has received for two weeks' work. Then the law provides that he can desert, which, of course, he does, having been informed by the Sailors' Union that he can't be taken back to the ship, the assumption being that the entire crew will desert the ship. Then the master must go to the union for his crew, and if on the Pacific he will pay £10 a month for his sailors and £11 a month for his firemen, those being the regular union wages. The wages on the Atlantic side are slightly less.

"The law, as it reads, makes all advances made in a foreign country illegal. Then with Lascar, Japanese or Chinese crews on British steamers the law is meant to say that the language of the officers shall be the language of the crew. The

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exact wording of it is that 75 per cent. of each department shall be able to understand all orders given by the officers. Please note that a Japanese steamer whose officers are Japanese can carry a full Japanese crew, and as they are not allowed to land in America they cannot desert; so if the law had been framed in Tokyo by Japanese statesmen it could not have been more favorable to them, so the Japanese shipowners are jubilant at the prospects of getting control of the commerce of the Pacific.

"The principal reason for this is to drive the Pacific Mail Steamship Company off the ocean, it being the only American line between China, Japan and the Philippines. This company's new schedule shows that the object of the unions has been attained, as no sailings are provided for after the law comes into force. Another clause states that any responsible citizen may make affidavit that a ship about to sail has not complied with the law. Then the Collector of Customs 'shall' withhold the ship's clearance notice. The word 'shall' we tried hard to get changed to 'may,' so as to prevent a responsible waterfront bum from holding up a steamer with probably 1000 passengers on board. It was pointed out to Congress that all those drastic measures would increase the rate of freight Americans would have to pay; this was also conceded by the labor unions, so British shipowners will just have to find out what all this extra cost will amount to and charge extra freight accordingly. There are many other restrictions in the bill that will materially increase the delay and cost of a foreign ship in American ports. However, there will be one satisfactory feature to British shipowners, namely, that this bill effectively puts all American ships out of commission in foreign trade, and those that have changed to the American flag during this war will be very glad to get back under the red ensign again. Notice to twenty-two nations has been given requesting the 'abrogation of their treaties with the United States,' to put this law into effect. We hope that Great Britain, who owns half of the steam tonnage of the world, will not accept this change in her treaty rights at the request of a nation that has practically no ships in the foreign trade. It certainly will be humiliating before clearance will be granted for British sailors to be compelled to go before the United States officials and get certificates that they are qualified A.B. sailors and that they are competent lifeboat men."

A Merchant Marine Referendum

THE Chamber of Commerce of the United States is conducting a referendum with regard to the various plans put forward with the purpose of upbuilding our foreign trade merchant marine. The stand taken by the New York Merchants' Association, one of America's principal trade bodies, on the questions submitted is of special interest and is reprinted below:

Two Groups of Questions.

The ballot is divided into two groups. In Ballot 1, organization members are asked whether or not they favor:

1. The Government undertaking the purchase, construction, or charter of vessels for mercantile purposes, together with the operation of such vessels.

Opposed.

2. Ownership of merchant vessels by the Government, but with operation under private parties under leases.

Opposed.

3. Subsidies from the Government sufficient to offset the difference in cost between operation of vessels under the American flag and operation in the same deep-sea trades under foreign flags.

In favor, subject, however, to provision being made for a Federal Board of Supervision, as provided in Question 1 of Ballot 2.

4. Subventions from the Government to establish regular mail and freight lines under the American flag to countries in which the commercial interests of the United States are important and to American dependencies.

In favor, subject, however, to provision being made for a Federal Board of Supervision, as provided in Question 1 of Ballot 2.

Committee Plan Submitted.

The second part of the ballot is based upon recommendations made by the Chamber's Special Committee on Merchant Marine, which is headed by Mr. W. H. Douglas, a member of the Foreign Trade Committee of The Merchants' Association. The questions included in Ballot 2 are as follows:

1. The creation of a Federal shipping board to investigate and report to Congress regarding the navigation laws and to have full jurisdiction, under the law, in all matters pertaining to oversea transportation.

In favor.

2. That the Government subscribe to the entire stock of a marine development company with a capital of $30,000,000, this company to have authority for seven years to lend, under supervision of the Federal shipping board, upon the security of first mortgages on merchant vessels, taking as evidence of this indebtedness bonds which bear a

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fair rate of interest and contain provisions for amortization, the development company to guarantee the bonds as to principal and interest and sell them to the public.

In favor; provided that it does not delay or obscure action by the Government on behalf of subsidy aid to the upbuilding of a National Mercantile Marine as advocated in the vote on Ballot No. 1.

3. That the ocean mail law of 1891 be amended by lowering the speed for first-class steamers from twenty to sixteen knots, and for second-class steamers from sixteen to twelve knots, and by making the compensation adequate to permit the establishment of lines of steamships carrying both mail and freight.

In favor, except that we do not deem it wise to reduce the speed of vessels earning subsidy of the first-class on European routes from twenty knots to sixteen knots, because if mails should be dispatched to Europe by American vessels of sixteen knot speed while vessels of other nationalities of a higher rate of speed are in operation, it would be prejudicial to our commerce.

4. That there should be legislation abolishing deferred rebates and providing for supervision of rates by the Federal Shipping Board, with requirements for filing with the Board schedules of rates and all agreements among over-sea lines.

Opposed, because the question covers details which come within the purview of the Federal Shipping Board, the creation of which we favor in our vote on Question 1 of Ballot No. 2, we being of the firm belief that this Board should not be hampered in its consideration of details.

5. That Federal licenses should be taken out by lines, domestic and foreign, engaged in shipping between ports of the United States and other countries.

Opposed, because the question covers details which come within the purview of the Federal Shipping Board, the creation of which we favor in our vote on Question 1 of Ballot No. 2, we being of the firm belief that this Board should not be hampered in its consideration of details.

The answers were prepared by The Association's Maritime Committee, of which Mr. George L. Duval is chairman. They were adopted unanimously by the Board of Directors.

Another "Cure-All" Nostrum

IF you take my prescription, I am sure you will have an American merchant marine. The American Federation of Labor, in a great national convention, unanimously adopted this resolution:

"Resolved, That we urge upon Congress to so change our registration laws that any vessel rated in the highest class of any responsible classification society may be registered as an American vessel, to sail in any trade, provided that she be compelled to carry citizens of the United States as licensed officers."

This resolution contains my prescription. As our laws now stand we have a so-called free ship bill. An American citizen may buy a ship where he pleases and obtain for it American register, but by the same law we restricted his right under it to engage only in the foreign trade. We said: "You may fly the American flag, but we will give you absolutely not one privilege under that flag that you do not have under the British flag." On the contrary, you will lose certain privileges which you have under the British flag. It is true that Great Britain permits any ships to engage in her British Isles coastwise trade.

Would Open Coastwise Trade.

England is not afraid that foreign ships will take her home trade away from her; but England is a little selfish, too, and only English ships can engage in the coastwise trade of her great colonies. Under the American flag you will lose that privilege. Besides this England has negotiated many treaties of reciprocity, under which her ships may enter the coastwise trade of many countries. Not a foreign-built ship would be under our flag to-day under the free-ship law but for the benefit of our neutrality and national standing during the present war, and after the war every one of them, if our laws remain the same, will go back under some foreign flag.

But if you will permit the ship that bears the American flag, under American register and owned by Americans, though built abroad, to engage in our coastwise trade, then that ship has obtained a privilege of value. Then when it comes from Liverpool with cargo to New York and goes back by way of New Orleans or Galveston to obtain a return cargo to Europe, it will not go empty, as it does now, but will bear a full cargo of freight from New York to New Orleans or Galveston, and all along its route it will be earning money and be at great advantage over the English vessels, which can carry none of our coastwise trade.

Our shipbuilders, though they will not believe it, will be profited in the end by such a law. They will not only build the bulk of the tonnage for

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our coastwise trade, but millions and millions of tonnage for the overseas trade and for the trade of other countries. You can no more drive our shipbuilders out of business than you can the shipbuilders of England.

The above is from the lips of Rufus Hardy, Member of the House Committee on Merchant Marine. We believe that Mr. Hardy is essentially wrong in two important points of his argument for free ships. In the first place he assumes a ship to be a manufactured article, which she is not. Even if five hundred ships were to be built as exact duplicates of each other, the ship would still not be a manufactured article. Ships, Mr. Hardy, are built. In another paragraph of Mr. Hardy's, not quoted, he cites the U. S. Steel Corporation's prices for steel as what can be done in America despite the lower wages of England and Europe. Mr. Hardy would have us infer that the Steel Corporation, other things being equal, pays higher wages and makes up for these wages in greater efficiency. This is true only in a very limited sense. If the mining of iron ore and coal had to be carried out in this country under the same conditions as it is in Great Britain there would be a far different story to tell concerning the price of steel plates. Then again the English shipyard, if forced to do so, could put economies in force which would leave the American yards hopelessly in the lurch as far as overhead expenses are concerned. The general officers and higher class technical staff are much better paid in English shipyards than they are in this country, our competitors under Mr. Hardy's scheme of things have been paying good healthy dividends to their stockholders year after year, a condition which unfortunately does not apply to the larger American yards, and furthermore, any piecework, profit sharing or efficiency plan adopted would help an American firm no more than it would a British one.



Andrew Furuseth, President, International Seamen's Union. A labor leader who, because Orientals could not join his union, forced the Oriental seamen off American and foreign ships. This will deprive thousands of stevedores from earning a livelihood and cause hundreds of American and European officers to lose their positions. Strangely the ultimate result of his efforts will be to turn the entire transpacific traffic over to Oriental interests—Japanese subsidized lines, manned solely by Orientals.

The second point on which we would take issue with Mr. Hardy is his argument that if we permit an American-owned foreign-built ship to enter the coastwise trade that there would be a great rush on the part of American owners to purchase foreign ships and place them in the foreign trade. Judge Hardy cites a ship coming from Liverpool to New York loaded, going to Savannah in ballast and from Savannah loading back to Europe. Now if this ship is going to be so much more profitable to her owners through being allowed to carry freight between New York and Savannah, then why in the name of common sense does not an American built ship engage in such a trade? Come now, why does not the American ship take advantage of this great opportunity that is hers? There is only one reason, and that is that the proposition is nowheres near as attractive as it looks. American coastwise rates are down to bed rock on freight especially, and in many instances would not pay the loading and unloading costs on an ocean tramp. If British wages ever become as high as American wages then, and then only, will we build ships as cheaply in this country as abroad, and Mr. Hardy's prescription could only result in the importation of cheap ships for use in direct coasting trades and the practical elimination of American shipbuilding.

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Breakers Ahead for New Law

As was predicted in the PACIFIC MARINE REVIEW many months ago the passage of the Seamen's Act has been accompanied by the usual American phenomena. The Government passed this Act and the President signed it in a fit of petty rancor directed against shipowners and now the Government seeks to sidestep the responsibility for the Act on the ground that it was not informed of what would result. The sponsors of the Seamen's Act have found themselves on the defensive with nothing but a single petty argument to advance, if the pitiable plea of that "The Seamen's Act now being a law everyone should cease criticizing it and try and live up to its measures," can be designated as an argument.

It would appear that the few American ships engaged in the transpacific trade are to disappear from the western ocean. Such a result is far more significant than the mere eradication of a steamship line. The United States possesses two important groups of islands in the Pacific, the Philippines and the Hawaiian Islands, and just so long as we intend to keep these possessions it is necessary to keep them supplied with garrisons, guns, ammunition and war material of all kinds. Will the Government of the United States send war munitions to these islands in foreign ships? The present European war has shown us just what is meant by an efficient spy system and surely no spy would wish for a better opportunity than the command of a vessel conveying American war supplies to the Philippines. If the Government forces its ship ownership plan at the next session of Congress, where will the Seamen's Act end up at? Is the Government willing to adopt the "Desert as you please" policy which, according to the Seamen's Act is the only true measure of freedom? To the Congressman and Senator who has been prating of slavery on the sea and the lot of the poor downtrodden sailor we would say that since he has now given the sailor the privilege of repudiating any contract he may make he should go a step further and give any ship's crew in the Navy the same privilege. If the crew of a battleship, a torpedo-boat destroyer or a Government collier cannot desert in a body if they see fit, is it reasonable for the Seamen's Union to hope that the crews of Government-owned merchant ships will be able to comply with the Union standard?

Foreign nations are taking the stand that the United States cannot abrogate any portion of a treaty without doing away with the entire treaty, in other words, the Seamen's Act is to become the bone of international contention and its survival in so far as foreign shipping is concerned will depend entirely on whether this country is willing to make costly concessions in order to purchase the good will of other nations on an obnoxious piece of legislation. The moment it becomes definitely known that the "Seamen's Act" will not "stick" on foreign vessels,—and we are thoroughly convinced the Government at Washington has little faith in its "sticking," American ships engaged in the foreign trade will take out foreign registry, the greatest opportunity for building up a merchant marine that this country has had in one hundred years will be lost and war-starved Europe will have the satisfaction of looking forward to the golden harvest of the American carrying trade as one of the greatest opportunities of recuperating her financial stability.

Admiral Fiske on the Navy

At the annual Alumni dinner of the Naval Academy at Annapolis on June 3rd, Rear Admiral Fiske delivered a speech which is deservedly attracting widespread interest. Speaking of naval officers' criticisms of the Navy he said:

"If we fear to do this, lest we incur displeasure and spoil our individual careers, we are unworthy of the uniform we wear, and we fail our country in her hour of need, just as effectually as if we deserted her flag in war.

"Let us estimate the situation briefly and consider first what kind of attack we should have to guard against. Evidently any attack by one of the great naval Powers is the only kind we need consider. Clearly, the attacking force would be as great as the attacking Power could spare, in order to insure its success and minimize its losses. This means that the attacking force would include battle cruisers, dreadnoughts, pre-dreadnoughts, scouts, cruisers, destroyers, submarines, mine depot ships, mine layers, mine sweepers, airships and aeroplanes, all fully manned and all strategically directed by a general staff.

Helpless Against Invader.

"What have we with which to oppose this force? A smaller number of dreadnoughts, pre-dreadnoughts and destroyers than the enemy would bring; no battle cruisers, no effective scouts, one airship recently contracted for, only three good aeroplanes not yet ready, an embryonic aeronautical service, two mine depot ships, one mine

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layer and twelve mine sweepers; also about forty-five submarines of all kinds and ages, distributed over the Atlantic and Pacific coasts, Panama, Hawaii and the Philippines, none of which have ever attempted feats like those so effectively performed in foreign navies now; and an inadequate merchant marine from which to get auxiliaries. To man even this insufficient material we have an enlisted personnel insufficient even for that, even in time of peace, and no trained reserves; and no general staff, or similar agency, to direct the whole.

Need Vessels and Men.

"This means that, reasoning on the assumption that the United States desires that the navy shall be able to guard our coast effectively against the only kind of attack that would be made, the navy must obtain several types of vessels and instruments that we do not now possess (or possess in only insufficient measure); must learn to use them, both as units and as members of one great unit, with a skill at least equal to that with which foreign navies already use them; must enlist, and efficiently train as large a force of enlisted men, active and reserve, as our probable enemy would send; and must develop a general staff or some similar agency, as skilful and experienced as theirs.

"We must make the layman realize that the naval profession has developed greatly within the last ten years in Europe, because of the imminence of the awful war for which her navies strenuously prepared; while we of the United States, feeling secure behind the bulwark of the ocean, have not seriously prepared, and have therefore dropped behind in the march of naval progress and have been, in fact, outstripped.

"We have seen the battle cruiser, the scout, the submarine, the airship, the aeroplane and the mine being developed by foreign nations into effective instruments of war; while their officers and men have been efficiently trained in their use and tactics; but we have not developed them into effective instruments of war ourselves, and, therefore, our officers and men have not been efficiently trained in their use and tactics. We have observed the formation of great organizations of highly trained reserves, but have gotten none ourselves worthy of the name.

Good Destructive Criticism.

"We have admiringly noted the wonderful work of the general staffs, but have provided no general staff or similar agency ourselves, though the recent creation of the office of Chief of Naval Operations is a step in that direction—that should have been taken fifteen years ago. We have no tested war plans, as all naval officers know, American and foreign; no tested organization for war, no proper system of communications; no tested mobilization scheme. As to gunnery, the news that keeps coming in of achievements in long range firing by European ships shows us that, while we are as good in gunnery as we have ever been, our competitors have accomplished feats greater than any that we have even attempted.

"This is destructive criticism, some may say. True, but has destructive criticism no constructive value? Yes, because until destructive criticism points out faults, constructiveness will not be used, and remedies will not be applied. During the laborious hours of preparation no criticism can be too keen, no searching out of faults too stern, no acknowledgment of deficiencies too frank. When the time for action comes, a buoyant optimism will stimulate courage and spur exertion; but until that time arrives, optimism and self-satisfaction work in the interests of the enemy.

"Although the country's sentiment is behind the country's navy, yet that navy itself is not a matter of sentiment, but a matter of fact. Have we or have we not a navy of such composition, organization, size and skill that it could successfully resist a probable enemy in war? If no is the answer, then the reason and the money of a hundred million people must work upon the navy until no gives place to yes. The hundred million people of the country, if they will prevent their own undoing, must build a navy that can keep her coasts inviolate; a navy that can guarantee freedom from foreign interference, while the nation works out its destiny; a navy that can further the aspirations of America and safeguard the happiness of her people."

As an example of how thoroughly the American trading ship has been swept from the sea the following table of entrances and clearances from the port of Swatow is of interest:

Nationality. Steamers under general regulations.	1913 Number	1913 Tonnage	1914 Number	1914 Tonnage
American	2	3,428	.....	.....
British	1,395	1,710,249	1,427	1,711,993
Chinese	74	71,728	90	91,328
Dutch	26	27,834	36	48,168
German	432	456,848	278	296,873
Japanese	441	473,560	465	509,100
Norwegian	98	107,436	128	136,104
Portuguese	4	2,856	.....	.....

Lloyd's Register of American Yachts with its lists of owners, particulars of yacht clubs, description and plates of burgees, owners' signals, and list of owners is always a welcome addition to the library of anyone interested in the doings of the ever-increasing multitude that look to the sea for their pleasures, and the 1915 edition is ahead of any of its predecessors, especially in the fuller detail given of the motive agent in all power boats. Some idea of the scope of the work involved in the preparation of the yacht register will be gained from the fact that it lists with officers and particulars over 600 active yacht clubs in American, Canadian and West Indian waters.

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The U. S. S. "Maumee"

ON April 17th the U. S. S. "Maumee" was launched at the Mare Island Navy Yard. The vessel was christened by Miss Janet Crose of Berkeley, California, daughter of Captain William M. Crose, U. S. N., formerly captain of the yard at Mare Island and now commanding the U. S. Battleship "Rhode Island" of the Atlantic fleet. Lieutenant Alexander Sharp, commanding the destroyer "Paul Jones," acted as escort to the sponsor.

The "Maumee" is a sister ship to the "Kanawha," which was launched in July of last year, except that the "Kanawha" is fitted with reciprocating steam engines of the usual marine type, while the "Maumee" will be propelled by oil engines. As the first big ship in the American Navy to be equipped with Diesel engines of large power, the future performance of this vessel will be watched with keen interest by marine engineers throughout the United States.

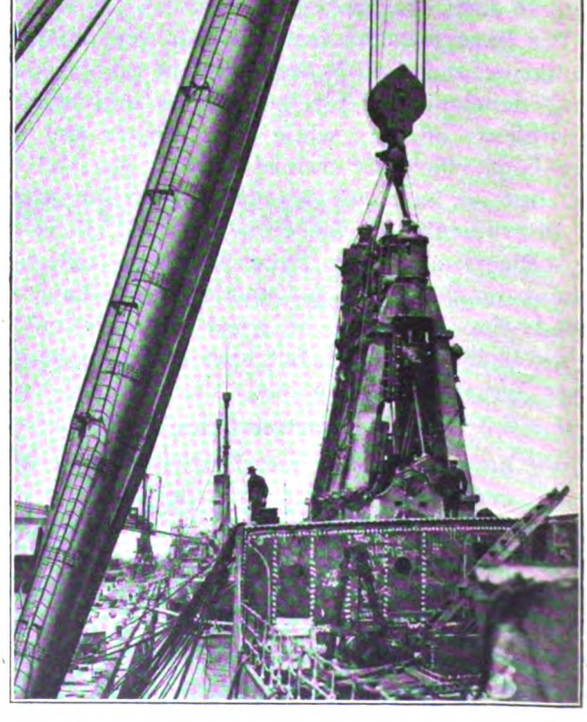
The keel of the "Maumee" was laid on July 23, 1914, and she could have been launched on January 23, 1915, if there had been any necessity for putting her overboard at that time, but she was held on the ways to facilitate the handling of heavy material on board. As a result, the "Maumee" presented a much more finished appearance as she slid down the ways than is usually the case at this stage in the building of a large vessel. In fact she was about 82 per cent. complete, against 65 per cent. on the "Kanawha," and the vessel is now ready to go into commission as far as her hull is concerned. The engines are being built at the New York Navy Yard, and as they are the first Diesels of large size to be built at an American navy yard, it is probable that the final commissioning of the "Maumee" will be considerably delayed.

The principal dimensions of the "Maumee" are as follows: Length over all 475′ 0″, length between perpendiculars 453′ 0″, molded beam 56′ 0″, molded depth 35′ 9½″, load draft 26′ 4″, displacement at above draft 14,570 tons, cargo capacity 2,260,000 gallons fuel oil, bunker capacity 469,100 gallons. Aside from oil tanks, the "Maumee" has a large cargo hold and summer tank spaces specially fitted for the transport of fleet stores, such as gasoline, lubricating oils, paints, etc. She is fitted with an efficient fire extinguishing system, using carbon dioxide gas, which can be forced by means of fans and a simple piping system into any compartment desired, and as carbon dioxide is heavier than air a reversal of the fans pumps out the gas. The propelling machinery, as in all modern tank ships, is located far aft. In addition to the driving Diesels, which are of the same type as manufactured by the New London Ship and Engine Company, two oil-burning, small-sized Babcock & Wilcox boilers are utilized to raise steam for operating dynamos, pumps, heating, etc.

The boat equipment of the "Maumee" includes a 33-foot motor sailing launch, two whaleboats and a motor dory. Another interesting item of equipment is found in the oil burning ranges and bake ovens in the galley, naval experiments having shown large savings in fuel through the use of oil for cooking purposes. The "Maumee" will have a complement of ten officers and 128 men with accommodations for an additional crew of 25 men. She will carry four 4″ 50-calibre rapid-fire guns, two on the forecastle and two on the poop deck aft, for protection against destroyers and submarines.

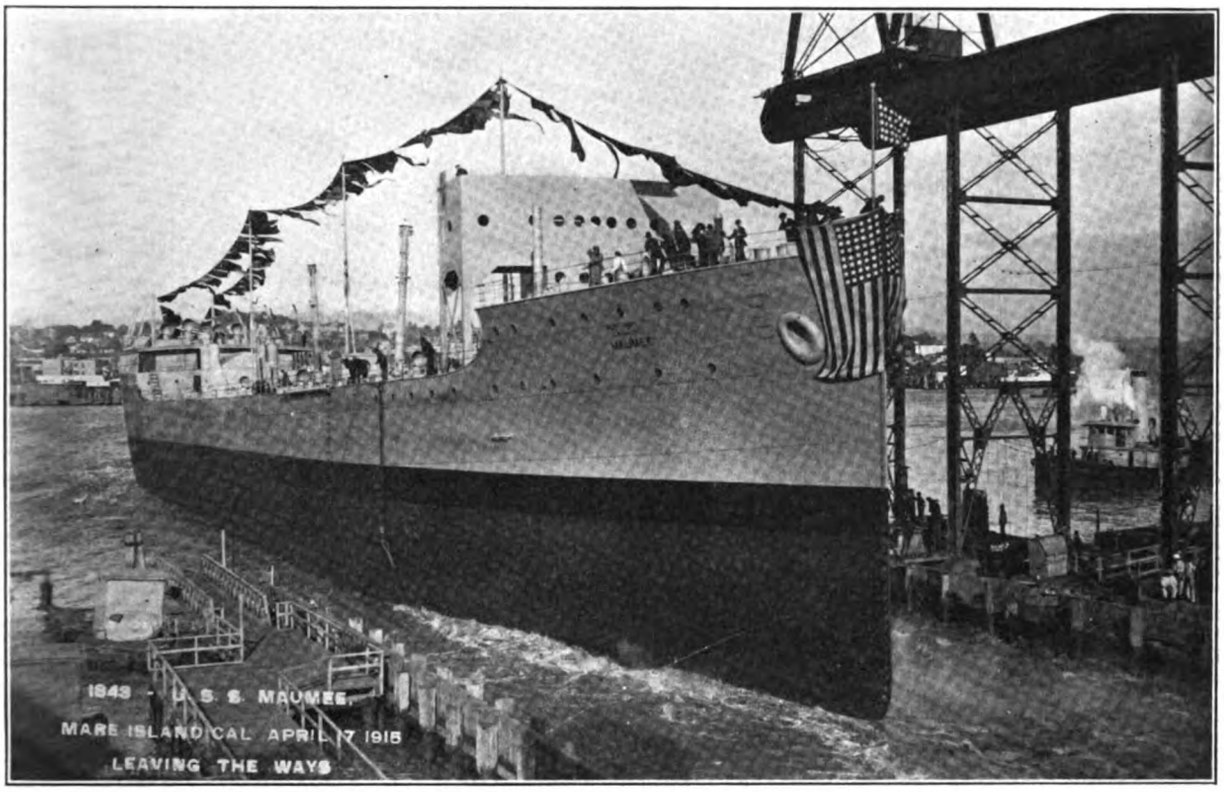
The speed of construction on the "Kanawha" and "Maumee" has been noteworthy. The keel of the "Kanawha" was laid on December 8, 1913, and she was launched July 11, 1914, seven months later; while the "Maumee," the second ship built on the same ways, was launched sixteen months and nine days from the laying of the keel of the first vessel. This is a record of which any yard might well feel proud, especially since the "Maumee" was ready to launch as early as January, 1915. Navy yard officials are also claiming a saving of $235,000 on the estimated cost of the vessels as far as the work done at the navy yard is concerned.

As the channel opposite Mare Island is not very wide, it was necessary at the launching of the "Maumee" to use some sort of stops and, in order to



The engines of the "Kanawha" being hoisted on board at Mare Island.

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The hull of the "Maumee" was practically completed when launched.

avoid handling the large amount of chain necessary for chain drags, a launch friction brake was constructed consisting of two cast steel friction blocks through which the vessel pulled two 6″ wire hawsers. The pressure of the blocks on the hawsers was regulated by means of spring washers and screws actuated by hand winches. In connection with these stops, a small mask was fitted on the stern. The ways had a sole piece forward which was sawn off in the good old orthodox manner. The launching went off without a hitch and the brakes were found to function satisfactorily, the ship being brought up about mid-stream.

Naval Constructor H. M. Gleason, head of the Hull Division at Mare Island, was in charge of the launching, and to him and his assistants belong much of the credit for the splendid showing that Mare Island has made upon these two big oil tankers.

The Diesel-Engined Tender "Chomly"

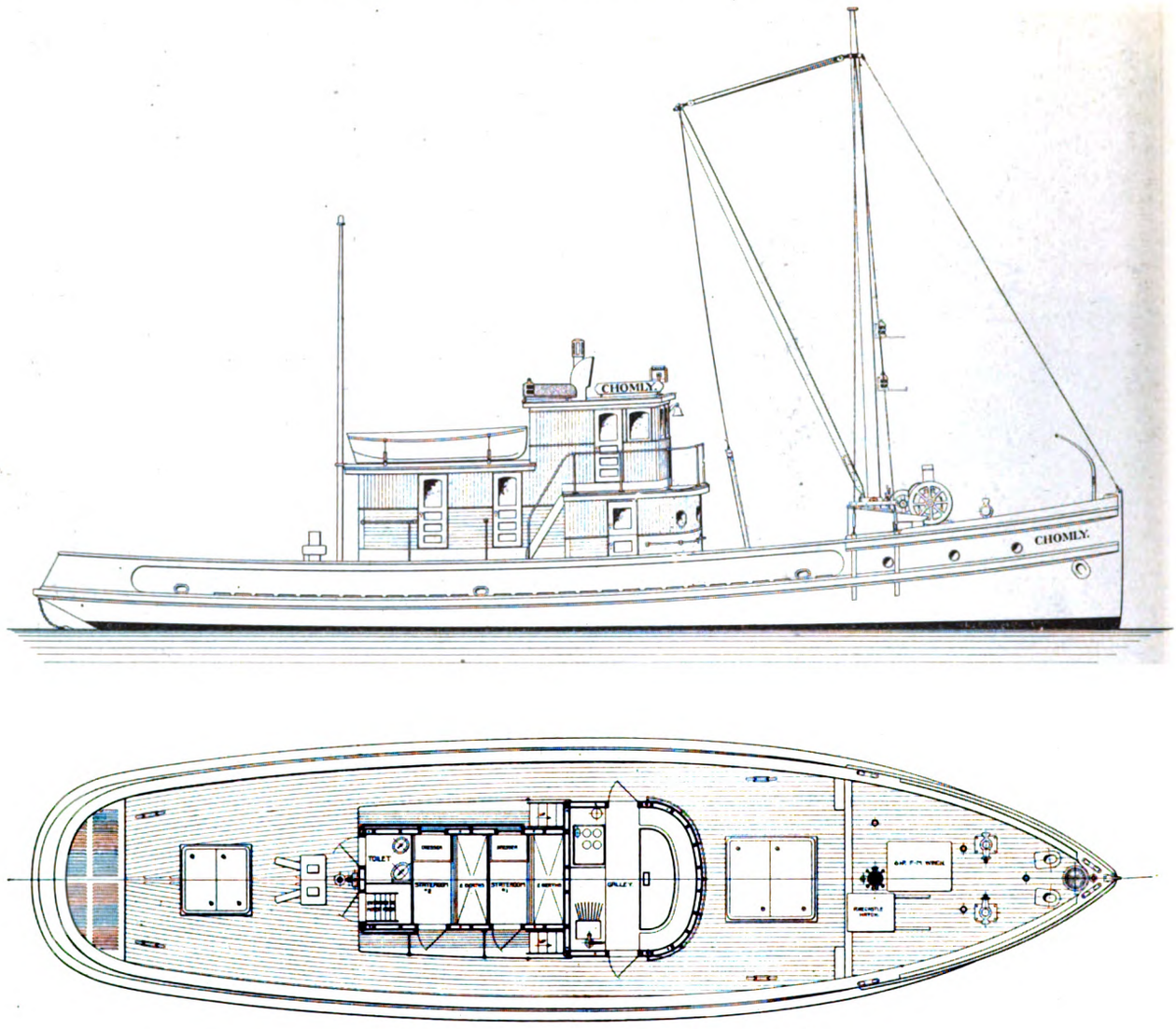
THE latest addition to the large fleet of vessels owned and operated by the salmon canning companies in Alaska, is the Diesel motor tender "Chomly." She is owned by the Alaska Pacific Fisheries, a company with headquarters in Portland, Oregon, and with plants in Alaska at Chilkoot, Chomly, and Yes Bay.

The "Chomly" was built by the John A. Martinolish Company of Docton, Washington, from plans supplied by Lee & Brinton, Naval Architects and Engineers, of Seattle. She is 75 feet long, 18 feet beam and 8 feet deep. The service to which these tenders are put is a severe one and they must be able to remain at work at all times, so the scantlings entering into the construction of the hull are very much heavier than would be ordinarily used for most vessels of this size, and she is designed to meet the worst conditions of weather.

The general arrangement is clearly shown on the plans and from these it will be seen the comfortable quarters given the crew and the fine location of the galley. In most vessels of this class the galley has been placed in the forecastle, a poor position to say the least. Within the last few years all new vessels of the best design in the cannery fleet, as well as those engaged in halibut fishing, have been made more comfortable for the crew with the galley located in some place other than the sleeping quarters. The captain is quartered in the pilothouse, which is placed above the galley. Aft of the galley are two staterooms, with two berths in each and these will be used by the superintendents and the engineers. Quarters for eight men are provided in the forecastle.

The "Chomly" is driven by a motor of the Diesel type, built by the New London Ship and Engine

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Outboard profile and deck plan of the "Chomly."

Company. A seven horse-power gasoline engine of the "Frisco Standard" type is used for the auxiliary machinery, namely, an air compressor, dynamo and water pump being connected to each of these machines by a friction clutch so that any one or all of them may be thrown in or out as required. There are two 1½" fire plugs, one on each side of the engine-room trunk, directly connected with the water pump. The piping is so arranged that all deck connections may be used for either suction or discharge. It was thought best to install this system for it is frequently necessary to pump scows while underway. There is also a hand pump which is placed on the main deck and connected as an auxiliary to the main water pump. The brailing gear is placed on the forecastle deck. It is of the Fairbanks Morse type, directly connected to a six horse-power gasoline engine, and may be used for derrick purposes or for hauling anchors. Two hand windlasses are located on each side and these may be used for handling all lines when the power winch is not available.

The vessel is lighted throughout with electricity and a storage battery installed. The pressure is 12 volts. A 100-watt incandescent searchlight, working on a 6-volt pressure is placed on top of the pilothouse and has proved itself quite efficient and sufficient for the work in which the vessel is engaged.

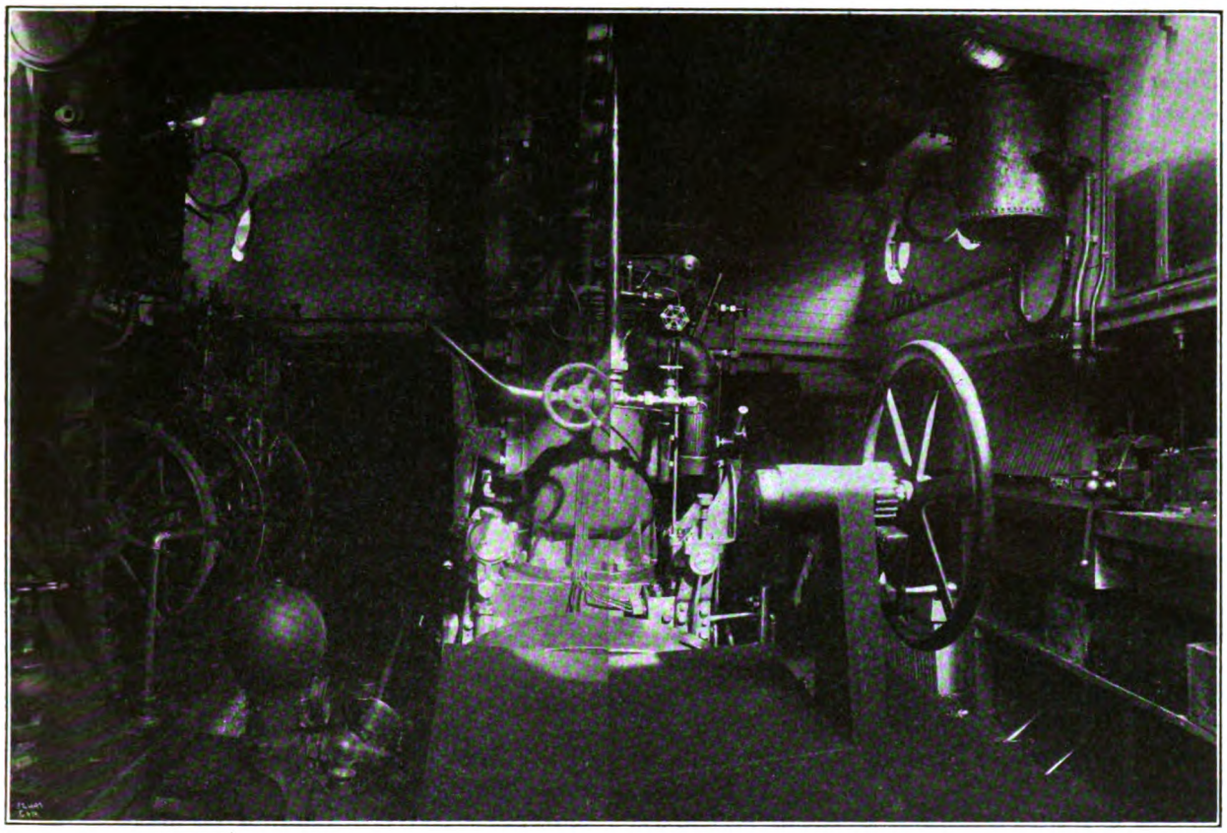
Note—To those not familiar with the principle of the Diesel, and especially as compared with a gasoline or distillate engine, it must be remembered that the Diesel is not an **explosive** engine, but a true internal **combustion** engine, the pressure in the cylinders never rising above compression pressure. The load is therefore taken on gradually, and gradually relieved, so the engine operates without shock.

The Main Engine.

The "Chomly's" engine is a Diesel, 120 H.P., four-cylinder, four-cycle, 9"x12½", 350 r. p. m., weighing 16,000 lbs. and of the usual Nlseco design, with air compressor on the forward end, driven from crankshaft.

Starting is obtained by means of compressed air, with starting attachments on two cylinders. When

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The engine room of the "Chomly" presents a simple arrangement.

starting, the engine runs on air on two cylinders, and on oil on the other two cylinders. After the first few revolutions, the air is cut off, and the engine runs on oil on all four cylinders.

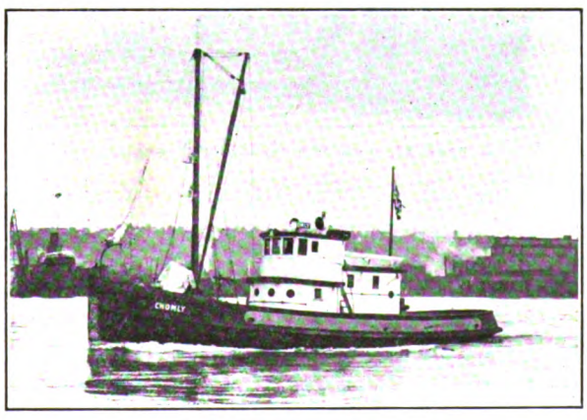
Part of the equipment with the Diesel is a small emergency air compressor driven from the auxiliary lighting and bilge pump engine; this small compressor being used for the original filling of the starting and fuel injection air bottles, and for use in refilling these bottles in the event of accidental leak, or when all air has been used during overhauling engine.

The fuel valves are in the cylinder heads and directly over the pistons. The fuel is supplied by a four-plunger measuring pump, driven from the after end of the inlet camshaft; the camshaft gears being inclosed in a case on the forward end of the engine. The fuel is taken from the main tanks through strainers and is pumped to an auxiliary filter tank, from which it flows by gravity to the fuel feed pump on the engine.

The starting air valve, fuel oil throttle, clutch control and gauge board, are located aft, and within close reach of the engineer.

A new and especially important feature of the engine is the method of lubricating main journals and crank brasses, by what is known as the positive circulating oiling system. Lubricating oil is contained in a tank on the forward bulkhead and above the top of the engine, feeding by gravity to a manifold on the housing on the inlet side of the engine, then to the main journals and through the webs to the crank brasses. The cylinder walls and pistons are lubricated at three different points by a mechanical oiler, which is driven from the inlet camshaft and located on the gear case forward. The oil collecting in the crankpit is taken up by a rotary pump, through strainers, and is cooled before being returned to the lubricating oil tank.

The cooling of the cylinders and heads, exhaust valves, exhaust manifold, goose neck, and thrust bearing, is accomplished by means of a circulating sea-water system, similar to that used on gas engines, the water being forced through the engine by a centrifugal pump driven by a friction pulley running off the flywheel. A plunger circulating



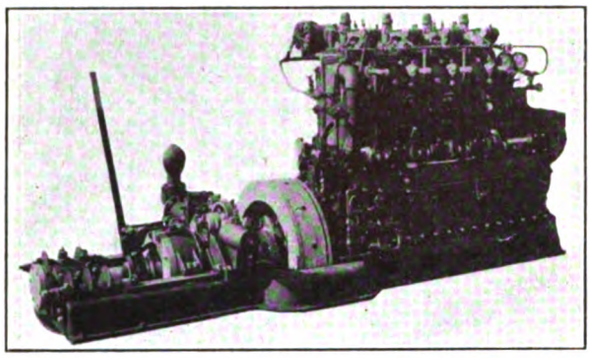
The "Chomly" under way.

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water pump, driven at one-half speed from the shaft, is furnished as a standby.

While on a trial trip on Puget Sound it was noticeable in the running of the engine that there was a complete absence of odor or smoke, the engine running cool, quietly and without vibration. The clear exhaust also showed that the heavy California fuel oil was being completely consumed in the cylinders.

The engine is rated at 120 brake horsepower, but can easily carry an overload up to 140 horsepower.



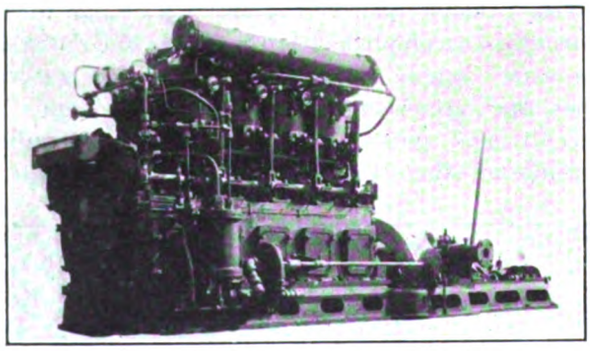
Front of the "Chomly's" NLSECO Diesel.

With the improved type of governor, the speed of the engine can be reduced from 350 to 50 revolutions.

The inlet and exhaust valves are horizontal, and so arranged that if a valve is broken off it cannot drop on the piston, thus preventing the possibility of further damage resulting from its getting into the engine.

The base of the engine is extended aft and carries the one-to-one clutch and the adjustable water cooled thrust bearing. The clutch handling gear consists of a quadrant and vertical wheel control.

The "Chomly's" engine burns from 6 to 6¼ gal-



A back view of the "Chomly's" engine.

lons of fuel oil per hour, the fuel costing 90c per barrel of 42 gallons (2 1/7c per gallon) at Seattle, thus showing the remarkably low fuel cost of 13 2/5c per hour. The consumption of lubricating oil is extremely small, and figures from 1/12 to 1/15 gallon per hour, according to load. The oil costs 40c per gallon, so it is evident that the combination cost for both fuel and lubricating oil for the "Chomly's" 120 H.P. Nlseco Diesel engine is from 16c to 17c per hour.

On a trial run from Seattle to Port Townsend and return, occupying 9 hours, the boat showed a speed exceeding 10 miles per hour with a combined cost for fuel and lubricating oil of only $1.49.

Down to the guards with a cargo of cannery supplies, the "Chomly" left for the North on the afternoon of May 13th, and anchoring two nights on the way, arrived at Ketchikan on the 18th, having made the 754 miles in 82 hours running time, with a fuel oil consumption of 492 gallons and a lubricating oil consumption of 5½ gallons, showing a combined cost for fuel and lubricating oil of only $13.27. The wonderful economy of the Diesel engine is shown in the following summary:

Total fuel consumption for 82 hrs. 492 gallons, or.....$11.07
Total lubricating oil consumption for 82 hrs. 5½ gallons, or..... 2.20

Total cost of fuel and lubricating oil for trip, Seattle to Ketchikan.....$13.27
Fuel consumption, per hour 6 gallons, or... 13c
Lubricating oil consumption per hour, 1/15 gallon, or.....2 2/3c

Total cost of fuel and lubricating oil per hour 15 2/3c

Fuel oil figured at 90c per barrel of 42 gallons, or 2 1/7c per gallon. Lubricating oil figured at 40c per gallon.

From the above it is readily seen that were this boat operating out of San Francisco with the cost of fuel oil at 75c per barrel, 1 4/5c per gallon, the cost for fuel for her 120 H.-P. engine would be 11c per hour, and adding the lubricating oil, 2 2/3c per hour, would make a total cost of 13 2/3c per hour.

The 120 H.-P. Nlseco in the "Chomly" was sold by Arthur Fuller, sales agent of the New London Ship & Engine Co., with Pacific Coast headquarters in Seattle, and is the fourth engine of this type placed in Pacific Coast workboats, as a result of Mr. Fuller's endeavors.

The American Bitumastic Enamels Company (Jas. Hermiston & Son) has secured the contract for treating the inner bottoms, bilges and bunkers of the three Bull steamers and the three new American-Hawaiian steamers building at the Maryland Steel Company's yard.

The "Seven Seas Magazine," the initial number of which recently reached the PACIFIC MARINE REVIEW office, is the attractive and well edited official organ of the Navy League of the United States.

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The Twin-Screw Motorship "Secundus"

IN 1909 the shipyard of Blohm & Voss in Hamburg associated with the Machinenfabrik Augsburg-Nürnberg in the study and development of heavy oil engines for ship propulsion.

The motor ship "Secundus" was ordered by the Hamburg-American Steamship Company, and it was originally intended to equip her with double-acting heavy oil engines, but for special reasons and the wish to gather additional data in regard to the single-acting type, the engines finally decided upon were made single-acting.

The main dimensions of the ship are as follows: Length between perpendiculars, 398′ 4″; greatest width over frames, 52′ 6″; depth to shelter deck, 35′ 0″; draft, 24′ 0″.

The ship is built according to the rules of the North German Lloyd and in appearance is very similar to the usual steam vessels of the same dimensions, there being a single smokestack in the center of the ship through which the exhaust gases from the main engines, and the smoke from the donkey boiler are led.

The two main engines are of the four-cylinder, two-cycle, single-acting, reversing type, with a bore and stroke respectively of 23.6″ and 36.2″. At 120 R. P. M. the brake horse-power of each engine is 1300. The engines are of the open frame, crosshead type, and are enclosed only where forced lubrication makes it necessary; therefore, all parts are very accessible.

The cylinders, heads, and pistons are of cast iron and while salt water is used for cooling the cylinder walls, the piston heads are cooled by fresh water.

The cylinder head contains two scavenger valves, one fuel or spray valve, one air starting valve, and one relief valve.

The crosshead, which is of the single slipper type, runs on a water cooled guide.

Aside from the piston cooling system, the main features of the engines are very similar to steam engine practice. The cranks are arranged at 90° to each other, and the crank bearings are of cast steel lined with white metal, and are water cooled.

The two double-acting scavenger pumps are placed outboard alongside the engine, and are driven by rocker arms from the crossheads. The scavenger cylinders are of 28.5 inches bore and 25.6 m.m. stroke, and run at a piston speed of 510 feet per min. The piston speed of the working pistons is 730 feet per min.

The scavenger pumps suck air through special suction shafts which are led from the deck, and before entering the working cylinders the air is cooled to 95° F.

The air compressor is of the three-stage type and is direct connected to the engine, and is provided with inter-coolers between stages.

The fresh water for cooling the pistons is furnished by plunger pump driven by rocker arms, and passes from the pumps through swinging pipes and rotating stuffing boxes to the crosshead. From there it is led through the hollow piston rod to the piston head.

The sea water for cylinder cooling passes first through the fresh water cooler and then to the cylinders.

The crankshaft and crankpin bearings have forced lubrication, while the cylinders are provided with force feed lubricators.

Each of main engine cylinders is provided with four plunger pumps driven by rocker arms. Two of these pumps furnish the sea water for cylinder cooling, another furnishes fresh water for piston cooling and the fourth is used as a bilge pump.

There are two cam shafts provided for operating the valves. The one on the back of the engine operates the spray valves through cams and levers, and the scavenger valves through eccentrics and rolling levers. The one on the front of the engine operates the air starting valves.

For the spray and scavenger valves, only one cam is provided for each valve. Reversing is obtained by means of a slip coupling in the shaft which shifts the cam shaft through an angle of 30° when the engine reverses its direction of rotation.

For the air starting valves, two cams are provided, one for ahead and one for astern. Above the starting cam shaft is the manoeuvring shaft. This shaft is turned, by means of an electric motor or handwheel operated by the engineer, through an angle of 150° either side of mid position according as it is desired to start the engine either ahead or astern. By means of cams on this shaft, the levers connected to the starting valves through links are brought into contact with the proper cams on the starting cam shaft.

There is an individual fuel pump for each cylinder. The regulation of the amount of fuel supplied to the cylinders, and hence the speed of the engine, is obtained by the timing of the pump suction valves. All of these are controlled by a single hand wheel, which also controls the supply of spray air, located at the operating station. Individual cutouts for each pump, operated by levers at the working platform are provided. For preventing the engine from racing in a heavy sea, there is an emergency governor fitted which operates directly upon the fuel pump suction valves.

The operations in starting the engine are as follows: First, the manoeuvring shaft is turned in

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the proper direction by the handwheel or motor. This turns the starting air on to all the cylinders. Second, the fuel and spray air are turned on, but no fuel goes to the cylinders since the starting valves and fuel pumps are so interlocked that fuel and starting air can never be supplied to the same cylinder at the same time. Third, as soon as the engine begins to move, the manoeuvring handwheel is brought back to mid-position, thus cutting off the starting air and cutting in the fuel one cylinder at a time until all the cylinders are running on fuel. The speed of the engine is then regulated entirely by the fuel control hand wheel.

To stop the engine, the fuel is simply cut off.

A lever for controlling the throttle on the air compressor suction is located at the engineer's station.

Turning gear driven by an electric motor is provided for jacking over the engine.

The engine-room contains the following auxiliaries:

2 auxiliary engines,
1 engine for the light circuit.
1 fuel supply pump (for taking fuel on board).
1 fuel service pump.
2 ballast pumps.
1 fire pump.
1 auxiliary boiler, working pressure 165 lbs. per sq. in.
1 evaporator.
1 distilling apparatus.
1 auxiliary condenser.
1 fuel pump for the boilers.
1 cooling water pump for the auxiliary engine units.
1 fan for forced draft for the boiler.
1 emergency compressor.
1 reserve lub. oil pump with two plungers.

Each auxiliary engine unit consists of an Augsburg 4-cylinder 4-cycle heavy oil engine with a normal output of 200 B. H. P. at 300 R. P. M. The engine is direct-connected to a 120 K. W. generator and may also be connected by means of a clutch to a Reavall compressor which requires 100 H.-P. at 300 R. P. M. The engines are capable of being speeded up to 360 R. P. M., at which speed they develop 240 B. H. P.

When the ship is at anchor the generators furnish the current for the windlasses and the Reavall compressor is used to charge up the main engine starting flasks if necessary. During sea service one of the sets is run at 240 R. P. M., thereby furnishing a 220-volt current for driving the ballast and auxiliary pump. The current is also put through a transformer and used for operating the steering engines. A second transformer cuts down the voltage to 110 and is used for lighting purposes.

A 2-cylinder hot-bulb engine drives a 15 K. W. generator for lighting the ship when in port and also furnishes current for running a small electrically-driven air compressor. The engine may be started by hand and thus if the air banks should leak it would still be possible to obtain air for starting the main engines.

The ballast pumps can be used for circulating water for cooling the cylinders, and the fire pumps for piston cooling. When the ship is manoeuvring both these pumps work continuously in order to obtain the best cooling effect possible.

A set of lubricating oil and cleansing pumps are fitted to the main engine framing and are driven off the rocker arms. One of these pumps draws the oil from a pure oil tank and forces it through two filters into the main bearings and the hollow crankshaft.

The dirty oil that accumulates in the crank case flows first to a sump tank, and is then drawn up by a pump and filtered before returning to the pure-oil tank.

The line shaft is fitted with forced lubrication at the tunnel bearings.

For starting and reversing the main engines the ship is fitted with 31 air flasks of 26 cu. ft. capacity each.

On March 11 and 12, 1914, a 35-hour official trial trip of the motor ship "Secundus" was run off and consisted of the following:

A seven-hour trip out from Hamburg down the Elbe toward the North Sea.

One twelve-hour run at 120 revolutions on the North Sea, including trials of the auxiliary machinery.

A three-hour run at low speed, sometimes as low as 35 to 40 R. P. M.

A three-hour run at 120 to 140 R. P. M.

A three-hour manoeuvring trial.

A five-hour return trip up the Elbe to Hamburg.

During the 12-hour endurance run each engine developed 1600 I.H.P. with a draft of 8′ 6″ forward and 14′ 0″ aft. The engines were not loaded more heavily since they had already carried full load on the test stand at the works. The effective H.-P. developed during the 12-hour run averaged 1065 with a fuel consumption of .463 lbs. per H.-P. H.

At higher loads on the test stand even more favorable figures were obtained.

With the compressor uncoupled, the fuel consumption was only .412 lb. per H.-P. H., so that for this condition of running the builder's guarantee of .453 lbs. per H.-P. H. was considerably improved upon.

During the three-hour handling trial, which was completed without trouble of any sort, signals were received from the bridge on the average of every two minutes, and frequently the interval between orders was only 1½ minutes.

The number of air flasks mentioned above proved sufficient for the most severe tests. Reversing by

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hand required 18 to 20 sec. from time of signaling from the bridge until the desired speed was obtained.

Prior to the installation of the engines in the ship, they had already run 144 hours under full load ahead and three hours astern. In addition runs at low speed and handling trials of several hours' duration were performed.

The design and construction of the engines is the result of the experience of the ship yard in marine engine building, combined with that of the M. A. N. with Diesel engines. In addition, the results of recent tests on a double-acting two-cycle oil engine on the testing stand of the M. A.N. afforded valuable data.

The researches on the double-acting two-cycle engine were of assistance in deciding between pneumatic and mechanical starting apparatus. The pneumatic equipment installed on this engine showed itself to be thoroughly reliable; nevertheless the mechanical gear was chosen by the ship yard for purposes of trial. At the present time similar engines are under construction by the M. A. N. for an oil tanker for the British Navy. They develop 1600 H.-P. in 6 cylinders of 22″ bore and 35.4″ stroke at 120 R. P. M.

In addition to the previously described design of Blohm & Voss, they have three stage compressors for a spray air, which are driven by levers. There are three of these compressors provided, two of which suffice to operate the engine, the third serving as a spare. All three compressors are used at once during extended manoeuvring and for the rapid generation of starting air. A pneumatic handling gear is provided.

DELAWARE YARDS BUSY.

Shipbuilding on the Delaware River has never been so brisk as at the present time, and if the influx of new orders continues for any length of time all the large yards in the country will be occupied to full capacity for at least two years. The Cramp yards have at present ten contracts under way and ready to lay down. These include a 10,000-ton tanker for the Guestica Petroleum Company, two passenger and freight ships for the Mexican Navigation Company, one steamer for W. R. Grace & Company, a steel yacht for Henry Whitney of New York, and five torpedo boat destroyers and some scows for the Navy.

The New York Shipbuilding Company holds fifteen contracts, including the super-dreadnoughts "Oklahoma" and "Idaho," and five smaller vessels for the Navy, six colliers for the Coastwise Transportation Company, two tankers for the Standard Oil Company and one tanker for the Petroleum Transport Company.

Harland & Hollingsworth has two contracts for tank steamers for the Anglo-Saxon Petroleum Company and Mexican Oil Company. These tankers are the first contracts awarded American shipbuilders for foreign owners in a great many years and give ample proof of the difficulties experienced at present in building ships abroad.



Launch of the destroyer "Jacob Jones" at the New York Shipbuilding Company's Yard. (New York Ship Photo.)

NEW SURVEYING VESSEL.

Plans and specifications of a new surveying vessel for the United States Coast and Geodetic Survey will be sent out to prospective bidders on July 1, 1915. This new vessel will be named the "Surveyor" and will be used in surveying and charting the coasts and waters of Alaska.

The "Surveyor" will be a two-deck single-screw steel steamer with a triple expansion engine and two Scotch boilers using crude oil as fuel. She will have a flush deck with high bulwarks forward and aft and a wooden deck house extending three-quarters of her length amidship. She will be protected by a double bottom which will extend the full length of the engine and boiler space and join watertight compartments forward and aft. Her bow will be of the pilot boat type and her stern will have considerable overhang to facilitate sounding operations. Her smoke stack and two pole masts will be raked aft in harmony with the character of her bow and stern and her general appearance will be that of a staunch ocean-going surveying vessel.

The principal dimensions and features of the "Surveyor" will be as follows: Length over all, 186 feet; length on water line, 160 feet; depth, 20½ feet; beam, 34 feet; draft (loaded), 11½ feet; gross tonnage (estimated), 800 tons; displacement (loaded), 1,000 tons; horsepower (indicated), 1,000; propeller (diameter), 10½ feet; working pressure (main boilers), 190 pounds; revolutions

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(average), 110 maximum speed (estimated), 12 knots; fuel capacity (crude oil), 230 tons; steaming radius (estimated), 8,000 miles; feed water (tanks), 20,000 gallons; store-room capacity, 10,000 cubic feet; steam launches (28 feet), 2; power whaleboats (24 feet), 2; whaleboat (28 feet), 1; cutter (28 feet), 1; small boats, 4; electric lighting and power, 25 kilowatts; refrigerating plant (capacity), 2 tons; wireless equipment (sending), 300 miles.

In order to simplify the work of shipbuilders in preparing bids for this vessel and to reduce uncertainties tending to increase amount of proposals, the specifications will call only for construction of hull, machinery and such equipment as are common to first-class merchant marine vessels of similar type. All remaining parts and equipment of special design, or peculiar to surveying vessels in general, will be obtained or constructed under separate specifications and bids to be submitted at a later date. This will not prevent the successful bidder for construction of the hull and machinery from bidding on the additional parts and equipment and their installation at the time of the submittal of the additional plans and specifications.

According to present plans, the additional parts and equipment to be secured by the Government under separate bids are as follows: All sounding machines and surveying equipment, all steam launches, all power and other boats, all compasses and navigating instruments, special davits for large steam launches, wireless instruments and equipment, refrigerating machinery, all sails, awnings, leather cloths, etc., all boatswain stores, hawsers, etc., all fire hose, fire extinguishers, life preservers, etc., gun mounts, rifles, etc., all carpenter tools, engineer taps, dies, drills, files, etc., all furniture, tables chairs, etc. not "built in" vessel, all upholstery, mattresses, bed springs, curtains, linen, etc., all galley and mess outfits, china, cutlery, silverware, etc., electric hoisting winch for steam launches located in winch room, all tackles, oars, sails, etc., for boats and power launches.

The material and structural requirements of the vessel will be entirely governed by the rules of the United States Steamboat Inspection Service and by "rules for the construction and classification of steel seagoing vessels" of the American Bureau of Shipping. The main engine, boilers, auxiliary machinery and any fittings of "stock" design fulfilling the requirements of first-class standard merchant marine practice will be accepted if substantially complying with the requirements of the plans and specifications.

The plans and specifications to be submitted to bidders will be divided as follows:

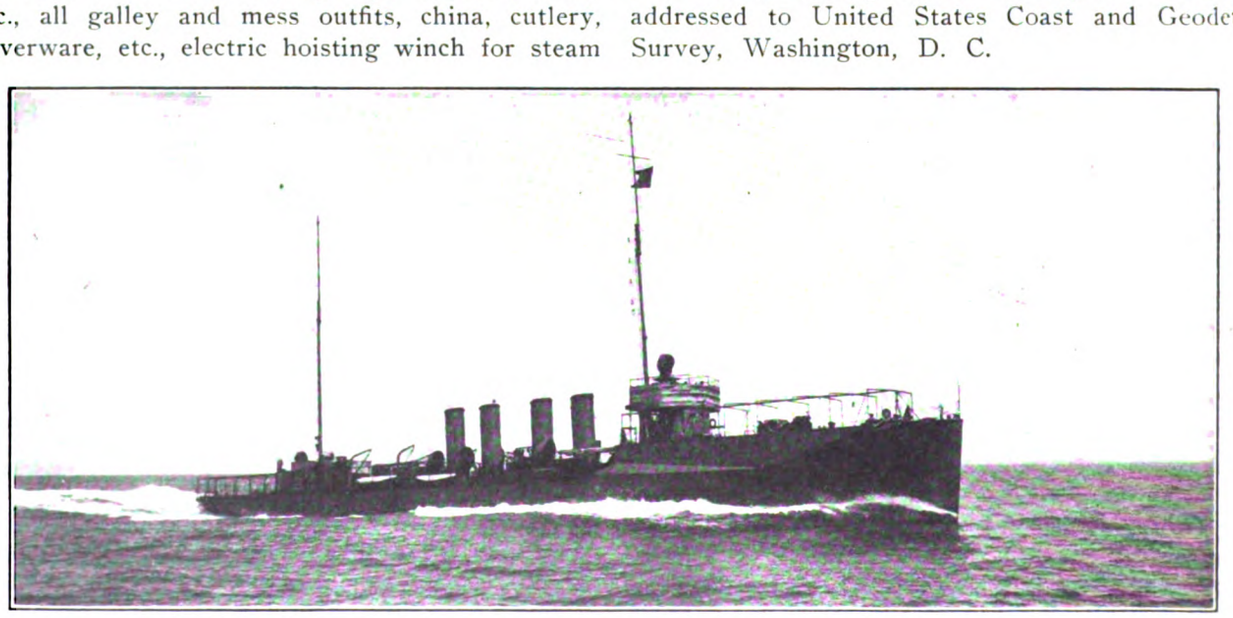
Specifications—(1) vessel as a whole; (2) hull, decks, etc.; (3) machinery, boilers, etc.

Plans—(1) lines, (2) inboard profile, (3) outboard profile, (4) typical sections, (5) bridge deck, (6) upper deck, (7) main deck, (8) lower deck, (9) holds and machinery space.

Following the custom of the Merchant Marine, the representatives of the United States Coast and Geodetic Survey designated to look after the construction of the "Surveyor" will be her prospective commanding officer and chief engineer.

For information of those interested, it can be stated that the allotment of funds for the construction of the "Surveyor" called for by the specifications to be submitted July 1, 1915, has been fixed at a sum not to exceed $190,000. The allotment of funds for parts and equipment to be secured by the Government under separate specifications at a later date has been estimated and fixed at $30,000. This gives a total of $220,000 available for the complete construction and equipment of the "Surveyor."

Requests for plans and specifications, or further information relating to the "Surveyor" should be addressed to United States Coast and Geodetic Survey, Washington, D. C.



Torpedo-boat destroyer "Ericsson" steaming at 30.41 knots. (New York Ship Photo.)

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THE LATEST ADDITION TO UNCLE SAM'S NAVY.

The opposite picture shows the U. S. torpedo-boat destroyer "Ericsson" steaming at the speed of 30.41 knots per hour over the official course off the Delaware breakwater, thus exceeding her guaranteed speed of 29 knots per hour by 1.41 knots.

This boat built by the New York Shipbuilding Co. of Camden, N. J., was given her official standardization trials by the trial board of the U. S. Navy Department on the official course at the Delaware Capes on May 18, 1915, twenty-eight runs in all being made at varying speeds.

When it is considered how the extremely varying steaming conditions, due to the wide variation in speed, on these tests were met by exceptional control and operation in the fire rooms without any smoke being visible from the stacks, demonstrates the exceptional engineering ability bestowed on the design and operation of the boilers and fuel oil system on this boat.

The result of recent hearings before the Supervising Inspector General anent the length of tows,, both at sea and in restricted waters, has resulted in the former Department of Commerce ruling remaining unchanged for reason best given in the following report:

"May 12, 1915.

"The Secretary of Commerce:

"In accordance with the provisions of the act of Congress approved May 28, 1908, and pursuant to your call of December 16, 1914, the Commissioner of Lighthouses, the Supervising Inspector General of the Steamboat-Inspection Service, and the Commissioner of Navigation, convened in the office of the Secretary of Commerce at 10 a. m. December 16, 1914, as a board to 'prepare regulations limiting the length of hawsers between towing vessels and seagoing barges in tow and the length of such tows within any of the inland waters of the United States designated and defined from time to time pursuant to Section 2 of the act approved February 19, 1895.'

"The purpose of the meeting was the consideration of the various letters and appeals from the different interests involved addressed from time to time to the Secretary of Commerce and suggesting changes and modifications of the present regulations, and referring specifically to Nantucket Shoals as a locality where the regulations are particularly hard to meet, and where a strict compliance with the regulations invites disaster and possible loss of life. There were present at the meeting the Secretary of Commerce and the Assistant Secretary of Commerce, both of whom took an active part in the proceedings and who evinced a lively interest in the testimony of the various witnesses, and whose pertinent questions and inquiries were of substantial and gratifying assistance to the board in its consideration of a most important matter.

"Fourteen witnesses representing the towing interests, and consisting of the owners, agents, and actual masters of towing boats, were examined, and were given the widest latitude in the explanation of their contentions and protests, all of whom expressed themselves as being perfectly satisfied with the opportunities afforded them to fully and definitely state their case. None of the representatives of the various steamship companies navigating the waters in question nor any of the masters of the steamships were present, their opinions, observations, and suggestions being in the form of letters received after the adjournment of the meeting. The opinions of the masters of the Lighthouse tenders in that district have also been received, and have been carefully considered.

"The masters of the towing boats agree almost unanimously that they should not be restricted or hampered in any way in the handling of their tows by any regulations, but that it should be left entirely to the judgment and discretion of the master when or where to shorten or lengthen his hawsers, and that the state of the sea and weather should determine his action at all times.

"Some of the masters of the towing steamers testified that a compliance with the regulations was impossible, and this in the face of an acknowledgment that they had never tried it, and they knew of no master that had tried it and failed, and so far as the statements of these gentlemen are concerned, they fail utterly to sustain the contention that the regulations should be modified. On the other hand, we have the statements of the masters of the steamships and lighthouse tenders familiar with the conditions of navigation, and who realize the possibilities of collision due to the extraordinary and dangerous length of tows in tortuous channels and congested waters, and whose interest in the safe navigation of their vessels and the safety of life give their expressions and suggestions the strength of reason and the force of truth.

"The present regulations were prepared by the board with great care after a thorough investigation of the conditions actually existing, and after having heard a large number of the representatives of the various interests.

"They were adopted after careful review and upon the conclusion that their application would entail but little delay and a minimum of inconvenience, having in view the purpose of the legislation, and were approved with a full understanding of their force and effect. They are neither drastic nor distressing, and can be met by all whose concern for safety of life and property should be paramount at all times, but are no doubt annoying to those who can not or will not realize the presence of other vessels which may be seriously inconvenienced or dangerously crowded by the maneuvers of long tows, especially in thick weather.

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Marine Terminals and Foreign Commerce

By H. McL. HARDING,
Formerly Consulting Engineer Department of Docks of the City of New York.

THE cost of transportation from the place of origin to the place of consumption generally limits the area within which business can be done. The boundary of this area determines how far raw material for manufacturing can be drawn, and to what distance the final products can be transported.

Many manufacturers in the United States cannot sell in competition outside a clearly defined area. If the cost of transportation be so vital to domestic trade within the nearby limits of one country, how much more important is it to competitive foreign commerce embracing remote countries.

It has been well stated that "He who can most economically and quickly reach the markets of the world can control the commerce of the world. A decrease in transportation expense not only facilitates commerce, but creates commerce and manufacture."

Commercial Supremacy.

The foreign trade of a country or a city is great as the country or city develops facilities for the flow of commerce through its gates, and its very existence as a foreign trade power may, therefore, depend upon its transportation efficiency.

Terminal Facilities.

Transportation efficiency has long been recognized by those countries which were the leaders in foreign commerce, as a terminal problem, and their main purpose has been to obtain the utmost development of terminal facilities for the economical and rapid transfer between vessel and shore.

Foreign Methods.

A study of the water fronts of the harbors of Germany, England, France and Holland, and of their cargo transferring, by means of cranes, traveling hoists and other mechanical appliances, clearly indicates what they have accomplished. The German engineers, even now, state that when the war is over they will devise new and superior mechanisms, by the superiority of which they will quickly regain their lost foreign trade. They even hint in what directions they intend to improve over present engineering methods.

Terminal and Carriage Costs.

To-day, by manual labor, it costs more to transfer and handle certain classes of freight, including all charges, at the terminals of an American steamship company in New York and Galveston, than the total carriage expense to the steamship company between New York and Galveston, a distance of two thousand miles.

The following figures are of official tests of twenty (20) traveling jib cranes at Montevideo, South America, and from the result of these tests thirteen (13) more cranes were ordered.

The crane manufacturers state in writing that they are willing to guarantee equivalent results by any of their harbor cranes.

These figures, based upon the official acceptance tests of the port authorities, give data as to actual time of transference and the output per hour.

Machinery Capacity.

Capacity of the cranes 5000 kg.=11,025 lbs.
Lifting speed per minute 24 met.=79 ft./min.
Revolving 1½ time/min., equal to 130 ft. at the hook.

The current consumption is figured for a cycle consisting of the following movements: Lifting 11,025 lbs. out of the vessel 25.5 feet high, revolving the crane through 120 degrees, lowering the load to the wharf, lifting the empty hook one foot, revolving the crane through 120 degrees back to its original position and lowering the hook to the position from which it was started. This was repeated a number of times in order to get the average time per cycle.

The time for one cycle was 70 seconds to which 20 seconds have been added for attaching and detaching the load; therefore the crane made 40 cycles per hour, making an output of

$$5 \times 40 \times \frac{2205}{2000} = 220 \text{ tons of } 2000 \text{ lbs.}$$

Harbor cranes are operated by one man only.

From the above figures made under the favorable conditions of a test, it will be seen that 220 tons are possible per crane, and with a vessel with five overall hatches, it is possible to operate two cranes at each hatch, which means that ten (10) cranes can be working at one time; which would give 2200 tons of 2000 pounds per hour.

Conservative Reduction.

Making all due allowances, raising only one consignment, mark or cross-mark per draft of merchandise with two- or three-ton cranes, burtoning to overhead traveling hoists, the capacity per crane in daily service may be reduced to only sixty (60) to eighty (80) tons per hour per crane instead of two hundred and twenty (220) tons. This is extremely conservative, and may be regarded as a minimum.

With the ten (10) cranes six hundred (600) to eight hundred (800) tons per hour can be easily attained, including the loading when full load capacity can be transferred.

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American seaports are just beginning to realize the possibilities that exist in the way of cutting down loading and discharging costs.

In ten hours, this would give 6000 tons and the vessel would be discharged and loaded in two days.

That is, by such machinery as is installed in every foreign commerce port of England, Germany, France or Holland, 6000 tons transference per day are to be compared with the 1500 tons at New Orleans. The ships' detentions will be one-fourth the time, and for the same berthing lineal frontage, four times as many ships can be berthed in a given period. The rental cost per ton would be one-fourth, and on a tonnage basis all the overhead charges would also be one-fourth.

Costs by Machinery.

The cost of discharging and loading the vessel called transference, that is, the crane movements, will be guaranteed by the manufacturers to be between three and six cents, including assorting, and the cost of handling, which may include assorting, as well as distributing and tiering, will add to this and make the total cost between thirteen and eighteen cents per ton. These latter prices include all operating expenses, labor, electric current, interest, maintenance and amortization.

We have, therefore, a maximum of **eighteen cents** per ton of 2000 pounds, against a **minimum** of **54.85** cents, as at New Orleans.

Shed Capacity.

By the use of the same machinery which tiers as well as distributes, by tiering fifteen to twenty

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feet in height, the capacity of a shed is tripled or quadrupled over the usual five feet tiering by manual labor.

Terminal Designing.

It is evident that the whole terminal must be correctly planned and the mechanical appliances properly adapted with sheds and warehouses rightly proportioned and the railway tracks coordinated for direct transference between water and rail.

Much attention has been paid by foreign port authorities to the plans of the marine terminals and the designs of sheds and warehouses and the location of the railway tracks so that all freight and cargo movements could be made rapidly and with the least friction. One generally accepted principle has been that it should be possible to transfer outbound freight from the doors of railway cars located between the shed and the ship into the hatchways of the ship, without rehandling at a cost not to exceed three to six cents a ton for the mechanical movement. Terminals are planned to secure similar direct movements between ships, sheds, warehouses and railway tracks.

Most all of such engineering rules and principles, the results of years of practical experience with a large merchant marine, should be of utilizable value.

Conclusions.

First—For all ports of the United States, and especially for those concerned with foreign commerce, those operating methods and mechanical appliances should be adopted which have proved most efficient in respect to time and economy of cargo transference and handling.

Second—That all new terminals, for inland and ocean navigation, should be so designed, planned and proportioned in respect to the piers, quays, sheds, warehouses and railway tracks, as to secure easy, quick and economical intercoordination between all these terminal elements and with the water carriers.

Third—That not only should the world's best be adopted and then adapted to the operating conditions in the United States, but American terminal engineers should continually study to achieve something better.

New Grand Trunk Pacific Dock

When the first Grand Trunk Pacific Dock in Seattle was built, it was the finest and most complete in the Northwest, and one of the best on the Pacific Coast. Its appearance, construction and arrangement was a credit to its designers and builders, and to Seattle's imposing downtown waterfront. No one dreamed that a fire such as occurred last July could in so short a time reduce the entire structure to a heap of charred wood and burned stumps of piles. But the fire happened and the dock was burned, and when the word came to rebuild as speedily as possible, along with it came orders for a structure as nearly fireproof as the proposed class of building could be made.

The Grand Trunk fire was the first big dock fire that had occurred in Seattle for years, and the obscurity of its origin caused quite a little excitement, and many drastic measures were proposed to prevent a repetition. There were many investigations conducted, and finally an ordinance was passed that worked surprisingly little hardship on anyone and embodied what an owner would wish to do to protect his own property.

The completed plans for the new wharf were approved by the Building Department of the city the day they were submitted, everything possible having been done to localize any fire which might start. Fire stops, constructed of tongue and groove plank every one hundred feet, a continuation of the superstructure firewall below the wharf floor, a tight deck constructed of 4x12 laid with splines, and hose reels every one hundred feet, are the main features of the fire protection. The fire at the Port Commission's Hanford Street Dock was a fine example of what this class of protection can do to confine a fire within defined limits.

Fire protection in the superstructure consists of fire walls of solid 2x4 and 2x6 with all openings protected by automatic fire doors, office partitions of solid 2x4, and the entire exterior walls covered with sheet metal. The roof is covered with asbestos roofing, many brands of which were tested before any one specified. As an additional roof protection, a sprinkler line runs along the ridge the entire length of the building. The roof space is divided into one hundred foot sections by fire curtains, constructed of tongue and groove plank, with a louvre window in the center of each section to prevent an accumulation of inflammable gases. The fire wall is placed just west of the waiting room, dividing the main office portion from the warehouse, and runs from the roof to a line eight and one-half feet below the wharf floor.

The new wharf is 600′ long by 116′ wide, and though 12½′ has been taken off the south side to make a wider slip, and the warehouse contracted to 90′ from 104′, the actual freight space has been increased by careful arrangement and the addition of a mezzanine floor at the outer end, served by

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The new Grand Trunk Pacific Dock has a pleasing and business like front.

a freight elevator. There are five 8′x30′ slips on the north side, two on the south side, and one slip 11′x40′ for the G. T. P. boats. Provision has been made for a Barlow Marine Elevator when increased business justifies its installation. At each slip is a power plug for operating electric conveyors.

The spur track is depressed so that the car floor is on the same level as the wharf floor. Outside the track is a loading platform seven feet wide to allow loading direct from cars to ship. Movable platforms are provided for handling freight across the depressed track which is carried across slips on bascule bridges.

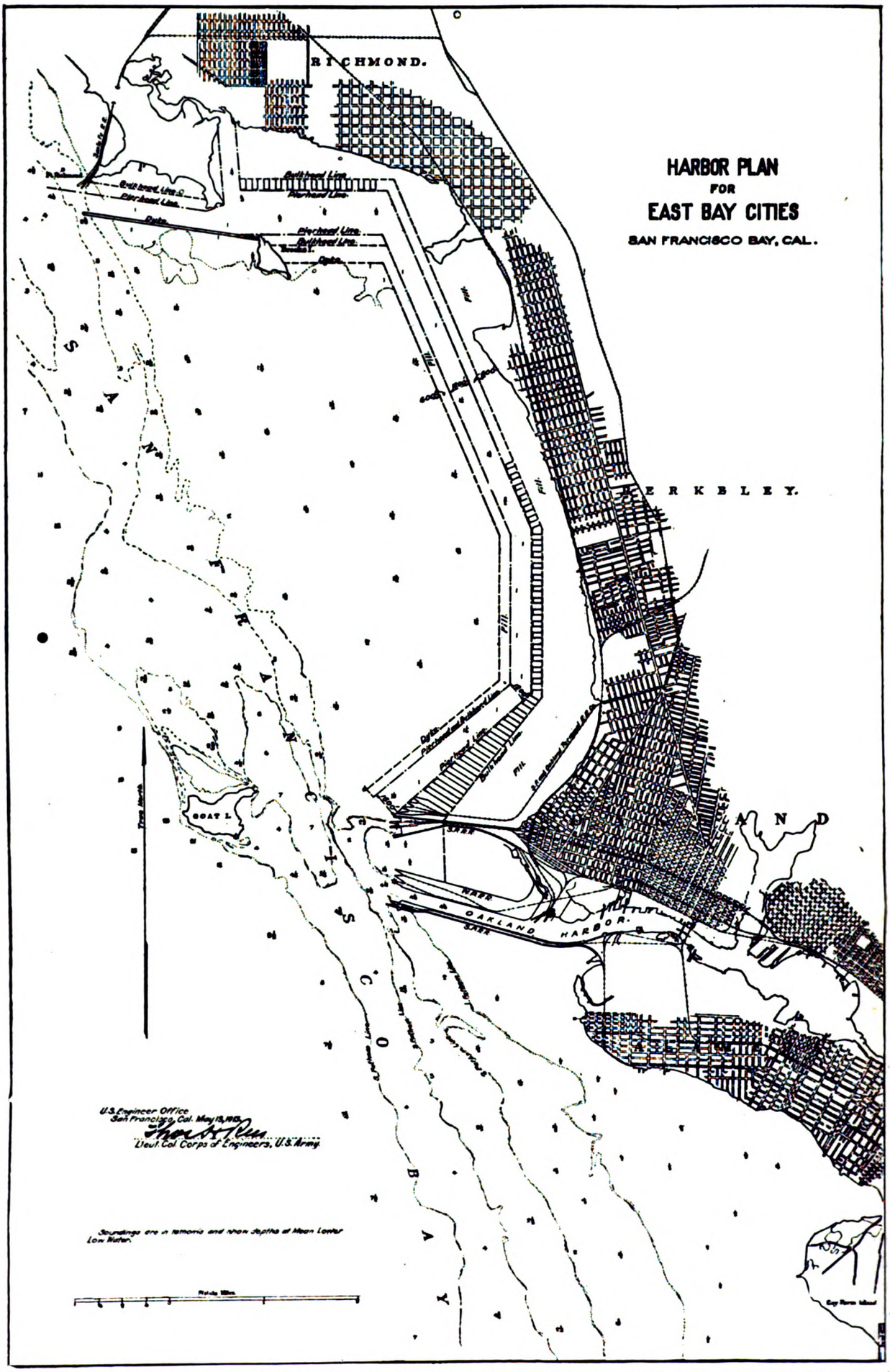
The Railroad Avenue elevation of the new building is very little changed. The Colman Dock front is to be rebuilt along lines similar to the Grand Trunk Dock, and between the two the Port Commission's Ferry Building will be designed to make the three properties appear as one terminal. For this reason the arch over the dock entrance has been lowered to avoid accentuating the wings at the expense of the central portion of the whole block. The overhead entrance from Marion street is to run the entire length of the three buildings and on the same level.

The waiting room has been moved from the outer end of the dock to a location nearer the street. It is 60′ wide by 90′ long, the length being across the dock. It was impractical to have the whole space on the second floor, so the south 30′ is a balcony over a row of offices and a corridor. From the windows of the lower portion the view is toward the north, and the balcony windows overlook the boat landing, the West Seattle Ferry landing and the Colman Dock. The ceiling is a plastered barrel vault, hiding all construction and giving an appearance of space and height. The lighting features are three rows of 61 lamps each across the ceiling and ornamental bracket fixtures on the pilasters and the balcony stairs. The ladies'



Side view of the new dock, showing the Pacific Coast Steamship Company's steamer "Congress" passing.

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With one line of coasting steamers already making regular calls, Oakland is looking forward to the complete fulfilment of her desire to become a seaport in every sense of the term.

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rest room is screened from the waiting room by a leaded glass arch and doorway. It is to be made a veritable bower of privacy and comfort. The waiting room doors through the fire wall are protected by rolling steel shutters, so counterweighted that when they have been closed by a fire, a person on the wrong side can easily open them and escape. A stairway leads to the baggage room which is located directly under the waiting room.

The walls and ceilings of the offices, corridors and waiting room are to be painted a light buff color with a dark trim. The paint used will be an enamel paint, washable and sanitary.

The G. T. P. boat landing is on the south side of the dock at the street end of the slip. Passengers disembarking step from the boat on to an adjustable platform—kept at boat deck level by electrical machinery—and then up the incline to the customs examination room, which is provided with every facility for the speedy examination of hand baggage. In passing out of the building the way lies through the waiting room or along the corridor to the lobby, and from there to Marion street via the overhead walk, or down the inclines to the cab stand or Madison street cable.

THE RECONSTRUCTED KEY ROUTE MOLE.

The owners of the Key Route System, recognizing that their wharf construction on the eastern shore of San Francisco bay must eventually be made a complete mole or solid embankment, in December, 1913, let a contract for filling and other work to the San Francisco Bridge Company. This work was completed on March 15th of the present year and represents the dredging and handling of two and one-half million cubic yards of material. The dredging was not continuous, however, as the slow completion of the rock walls, which was included in separate contracts to other parties, necessitated the San Francisco Bridge Company stopping its dredging operations on several occasions for a month or more. For the inner part of the pier the old line was utilized and the fill made around the old trestle work. Along this portion of the pier, extending out to the cross rock wall (which was constructed by the city of Oakland) the fill was retained by a rock wall along the north side, but was permitted to run out on a flat slope towards the shore on the south. Beyond the cross wall the pier swings over towards the north and the fill is retained by rock walls on each side. This portion of the fill is 5300 feet long and 200 feet wide on top. This fill extends as far out into the bay as the Government engineers will permit and is continued by trestle work, for which the San Francisco Bridge Company also has the contract.

The trestle consists of creosoted piles, 9 in each bent, bents 15′ 0″ centers. The caps are 12″ by 12″ timber and the track stringers consist of three 8″ by 16″ under each rail. The ties are 8″ by 8″ by 30′ long and the guard rails are of 8″ by 8″ timbers notched down over the ties. This trestle, as originally planned, ran in a straight line to the ferry slips, and widened out for the last 1000 feet, forming a train yard. This would have permitted the trains to enter the depot at a steep angle and would have eliminated the present awkward arrangement of having tracks side on to the ferry slips. For lack of sufficient funds, this plan was changed, and the trestle swung into the old structure, thereby utilizing all of the old switches and terminal tracks and eliminating the proposed new terminal yard. All of this trestle work was practically completed several months ago, except for an opening which had to be left near the rock wall to permit of taking in rock barges to finish riprapping the slopes. The length of the pile trestle from the end of the fill to where it joins the old tracks is approximately 3800 feet.

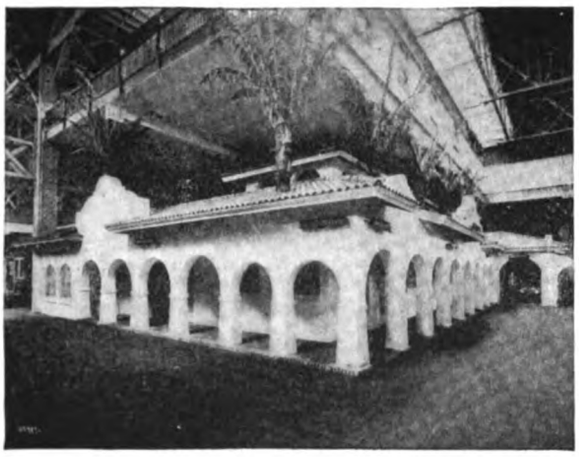
"HOME ELECTRICAL" AT THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION.

A novel exhibit at the Panama-Pacific International Exposition, one that has attracted unusual attention and has been crowded with visitors since it was opened, is the "Home Electrical" in the Palace of Manufactures. This is a full-sized model home in which electricity is made to perform the domestic tasks and labors. Electricity cooks, washes, launders, sweeps, dusts and fulfils countless other household duties; and it also heats, lights and cools the house.

This is but one of the exhibits of the General Electric Company. It is co-operative to the extent that it comprises a very comprehensive display of devices operated by this company's motors, many of the devices themselves being the products of other manufacturers, several of whom have no other representation at the Exposition. The home is in no sense an exhibition to demonstrate the radical things that may be done with electricity in a house. It is in every way a practical modern home, and every one of the electrical devices shown is entirely suitable for the average family. The exhibit is completely operative and is intended to be broadly educational.

The "Home Electrical" building is of simple, Spanish-California, bungalow design and moderate cost. The exterior is of gray stucco, the roof is of red tile and a columned portico extends along two sides. The interior consists of a large living room, dining room with breakfast alcove, bedroom, nursery, sewing room, bath, kitchen, refrigerator room and laundry. There are also an electric garage, a workshop and a small creamery. The

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The "Home Electrical" at the Exposition.

home is completely furnished and attractively decorated, all in good taste, ready for occupancy.

The veranda is generously illuminated with Mazda lamps in suitable fixtures; the house number is an electric transparency, and electric bells operated by transformers announce your presence at any door. The living room is lighted with Mazda lamps placed in semi-indirect fixtures, the light being diffused and distributed by reflection from tinted walls and ceilings. An electric "fireplace" of the luminous radiator type furnishes both warmth and pleasing light. The electric piano player will entertain visitors either with classical or popular selections.

Adjoining the living room is the dining room. This is lighted by Mazda lamps in fixtures that provide direct illumination through tinted shades. It is heated by electricity and the air is kept constantly refreshed by a small electric fan. Here are electric heating devices for the preparation of lunches and light refreshments; a radiant toaster, an electric coffee pot, a tea samovar, a disc stove for general cooking, a uni-set, a chafing dish for preparing hot soups or desserts, and an electric grill for broiling, toasting, preparing eggs, etc. If desired, a very substantial meal can be cooked on the dining room table. Another electrical feature is the warming closet at the entrance to the butler's pantry. To the right of the dining room is the breakfast alcove, very cosily arranged and also equipped for "table-cooking." It looks out upon a vine-covered patio with ferns and flowers and a tiny spring.

Between the dining room and the kitchen is the butler's pantry. In it is installed a combination butler's sink and dish-washer for cleaning the light and valued wares. On a shelf there is a disc stove for making dressings and sauces, and a small electrically driven buffer for polishing nickel and silver pieces. On the wall is the annunciator of the door bell system.

In the kitchen, the workshop of every home, an electric range, equipped with hot plates, broiler and ovens, is ready to cook the largest family dinner. A constant supply of hot water is obtained from an electric water heater attached to the usual kitchen water tank. A household ozonator and exhaust fan combine to remove unpleasant odors. Should the day be chilly, a portable air heater can be put into service. A new device, which does away with dirty and impure ice, is the electrically lighted and cooled refrigerator, where small cubes of ice also may be obtained. There is also an electrically driven ice cream freezer, and a connection with the inner-house phone for saving steps is the final kitchen convenience.

The bedroom contains many electrical conveniences and articles for the toilet, including an electric massage vibrator, electric curling iron, hair dryer and boudoir lamps. There is an electric heating pad and a small electric water heater in case of sickness. The bedroom is heated by electricity in chilly weather and cooled with an electric fan when the nights are too warm. There is a connection for the vacuum cleaner. The room is also provided with a telephone connection to all parts of the house. Most interesting of all the electrical appliances in the bedroom is the burglar switch, which, when needed, lights every lamp in the house.

Near the bedroom is the nursery with its electric toys and an electric device at the window to keep the room supplied with fresh air without dangerous drafts. The nursery is heated by electricity and there is an electric nursery outfit for preparing medicine, food, etc. in case of sickness. An electric heating pad is also provided to warm up cold hands and toes.

The bathroom is finished in white tile and porcelain. Here are such electrical conveniences as a hot water cup for shaving, a glowing electric radiator, an electric vibrator and a hair dryer. An exhaust fan and an electric ozonator maintain a wholesome atmosphere. The hot water for the bathroom is drawn as usual from the tank in the kitchen.

The sewingroom is replete with electric appliances for sewing, mending and dressmaking. The sewing machine is operated by an electric motor



The kitchen in the "Home Electrical."

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Breakfast nook in the "Home Electrical."

controlled by the foot treadle. A three and a six-pound electric iron are located on a convenient board, and a small portable vacuum cleaner is used to pick up threads and scraps of cloth. A connection to the inner-house phone saves many steps. A small air heater and a fan keep the room warm and comfortable at all seasons.

The home is equipped with a complete electrical laundry. There is a quiet-running washing machine and an electric mangle, which may be entrusted with delicate pieces; three, six, eight and twelve-pound irons for ironing and pressing, and a double 8-in. hot plate for boiling clothes. A collapsible ironing board folds into a shallow closet, and the flatiron switch is equipped with a pilot light to indicate whether or not the current has been turned off. An air heater and exhaust fan provide comfortable working temperatures.

Provision has been made, in the shed, for constant water pressure all over the house when the water supply is a well or spring. Here is installed an automatic air-pressure system. The pump is driven by a small electric motor, controlled by a pressure switch.

Nearly every home has a workshop where the-man-of-the-house builds and repairs, especially in country places. The shop is equipped with a work-bench, bench-type drill press, clipping hammer, electric riveter and grindstone. Then there is a buffing outfit, saw table, bench-type lathe and metal melting pot, all electrically operated. Handy little electric soldering irons and an electric glue-pot aid in repairing leaky utensils or broken woodwork. An air heater provides comfort.

In the garage is a light electric coupe, which is kept charged automatically by a mercury-arc rectifier. The lighting batteries are charged by a small vibrator. A small portable search lamp, which can be operated on any electrically lighted car, is used for close examination of any part of the car, and a portable electric tire pump complete the car equipment. Connections are made to the interhouse phone in both the garage and workshop. An air heater is also installed in the garage.

Of particular interest to the visitor from rural communities is the dairy. This is equipped with an electrically-driven cream separator, bottle washer, and churn. In conjunction with these appliances is an automatic refrigerator and milk cooler, operated by a thermostat to keep the temperature of the cooling chamber at the proper point.

The "Home Electrical" demonstrates the extent to which electricity is readily adaptable for all kinds of domestic service where light, heat and power are required. These electrical devices are simple to use and comparatively moderate in cost. Some of them may be operated as reasonably as an electric iron. It is possible to install many of them without extra operative costs by taking out old carbon incandescent lamps and replacing them with modern Mazda lamps, which save fully two-thirds of the current; and this can be used to run fans, cooking devices, vacuum cleaners, etc., without increasing the monthly lighting bill.

THE ELECTRIC STEVEDORE.

By A. JACKSON MARSHALL,
Secretary, Electric Vehicle Association of America,
29 West 39th Street, New York.

That anything as distinctly modern and prosaic as an industrial truck could have a very interesting history seems rather unlikely, yet it is recorded that even the Egyptians and Assyrians had their industrial trucks—of a very primitive type to be sure, but efficient enough to carry some of the great blocks of stone used in building the pyramids. These early conveyances were nothing more than sledges which were dragged along roads smoothed and hardened especially to lessen the friction. Sometimes merely a forked tree limb with boards placed across it for a platform was used as a drag. Later friction was lessened by small rollers used on the sledge runners which in time developed into the wheel and axle—one of man's greatest contributions to world progress. This greatest of all mechanical devices was first used on one of these small vehicles by the Assyrians and soon developed the wheel-barrow and cart.

In America the genesis of the modern electric industrial truck is found in the necessity for an automatic device efficient enough to cope with the ever increasing transportation of baggage and freight and with growing commercial industries. As terminals became larger and baggage rooms, postoffices and express depots became longer, a quicker and more capacious truck was demanded, and so one railroad—the Pennsylvania—engaged a mechanical engineer to design an electric hand truck, as it was then called. So successful was this application of the first "Electric Stevedore" that it was shortly applied to other operations.

When any mechanical device proves itself a labor

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and a time saver, combining both efficiency and economy, it is only a short time before it becomes popularized, and beginning with 1911—only four years ago—various developments of the electric industrial truck followed each other very rapidly. To-day over 1000 of these modern carriers are used in the United States and Canada. The average layman has but a small conception of the tremendous amount of work being done on piers, in railroad terminals, in industrial plants, by these powerful little storage battery trucks.

It is estimated that in the United States alone there is a grand total of 720,000,000 tons of goods every year which passes through the railroad freight and transfer stations. The present lack of system in handling this freight and the tremendous amount of lost time involved represents a yearly loss of more than $80,000,000. With the existing antiquated and inefficient methods there is constant confusion and delay where thousands of conveyances endeavor to get served within a few hours. This causes the transfer mediums to be held up for several hours inactive with resulting losses. As the use of the "Electric Stevedores" increases, it is to be hoped that this will influence a further systematized manner of delivery. As their work becomes more thoroughly unified, the freight sheds and docks in many cases will operate on a 24-hour schedule. With the virtual freedom of city streets great electric commercial vehicles, operating silently, will transport the goods by night to well located centers from which goods may be distributed the following day and delivered when business houses are prepared for their receipt. This seems to be the only way to solve the problem of congested freight piers in cities where increase in size of the terminals is rendered impracticable for physical reasons, the cities in most cases having steadily built up around them. To-day the only hope for decreased congestion is increased efficiency such as will enable street vehicles to discharge or receive their loads with celerity, and this must be effected by speeding up the movement of freight over the platforms, in using more efficient transfer means between the vessel holds or freight cars and the vehicle tail-boards, and in organizing a system of distributing centers to supplement the cramped terminals.

In railway terminals alone where these modern electric carriers have supplanted the hand trucks it is estimated that there is a total saving of 66 per cent. A short description of the operation of an electric industrial truck will show its simplicity and safety. The controller is inclosed and an automatic cut-off switch minimizes accidents. One handle is used as a controller lever, and the other handle for steering. The controller returns to neutral as the hand is removed from the lever. The cut-off switch cuts off the power when the foot is removed from the brake pedal. In other words, the driver applies the brake simply by releasing the pedal with his foot, and as he releases the pedal, the power is cut off automatically.

The driver, standing erect on the end of the truck, with hands on the controller and steering lever, respectively, and foot on the brake pedal, is in the best possible position to guide and control his load. The simplicity of operation does away with the necessity for having expensive operators, the average freight handler being taught to successfully operate a truck, even in congested plants or terminals, in about 48 hours. The ordinary baggage truck has a capacity of 2000 lbs.

Time studies made in manufacturing plants and at the great piers in seaport cities indicate beyond a question that "Electric Stevedores" will supplant the hand truck wherever operating conditions warrant. More than this, the shipping platforms and piers of the future will be designed especially for the more efficient operation of these electrics. They already have a tremendous influence on the short haul.

Down in Savannah you may see cotton moved across great piers by "Electric Stevedores" equipped with hoists and cranes, carrying it directly into the holds of the steamers which bring it north. Two of these little Electrics would handle more cotton in one day than twenty freight handlers. At the Bush Docks in Brooklyn you can see the same cotton placed in cars by battery truck cranes, the cars first being "spotted" by the electric. It is taken out of the cars at the mill by the industrial trucks and moved to storage and then to the spinning room by them. Later the bobbins, dye tubs, and beams are moved from mill to mill by small electric shop trucks.

The "Commercial Vehicle" in a recent issue cites an excellent example indicative of the economy of operating these "Electric Stevedores":

"In testimony submitted for the information of the Interstate Commerce Commission, a report of the operation of an electric industrial truck at the Cunard pier, New York City, showed that in handling macaroni in boxes, six electric industrial trucks did the work in nine hours, that would have required 24 hand trucks. The cost of labor with the electric vehicles was $21, while at current longshoremen's rates it would have cost for labor $87.60, if hand trucks had been relied upon.

"In handling grapes in barrels at the same dock, two industrial trucks did the work of 21 hand trucks. In handling mackerel in barrels, two electric industrial trucks did the work of nineteen hand trucks. In handling casks of wine, seven electric industrial vehicles with thirteen men, did

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the work of 36 men rolling the casks from one man to the other."

Under the old method of hand truck operation, the cost per ton of handling freight at railroad terminals and steamship piers was 25c, while the cost per ton for performing the same work with electric industrial trucks is but 10 1-3c.

While the largest field for the "Electric Stevedore" is in handling baggage and freight at terminals and piers, they are being used to a great extent, however, in factories and industrial plants, and more and larger installations are being made continually. In shop and mill transportation, in storage warehouses, in freight transfer stations, in supply and provisioning work for railroads, steamships, etc., in brick and lumber yards, in stoking in power plants, in wholesale and retail packing, shipping and receiving, and even in building operations the electric industrial truck finds extensive applicaton.

According as necessity has created the demand, various types of these trucks have been developed. They are made small enough to operate in the aisles of factories, and storage warehouses, to run on elevators and into freight cars, motor trucks and horse wagons, yet they carry from one to two tons, the latter being standard capacity. They possess sufficient power to haul trains of trailers, and they can climb grades that would tax the power of mules, and would be impracticable for hand trucks. Elevating transfer trucks have been developed by which it is possible to pick up, carry away, and set down, interchangeable false platforms with piles of goods on them by automatic means, thus eliminating the last item of hand labor, the loading and unloading of the trucks.

It should not be overlooked that this small truck has many of the fundamental advantages of its larger brother in the street, namely, it is clean, odorless, and practically silent, its simplicity of construction is a great aid in operation, and maintenance, and its freedom from fire and explosion commends it to fire commissioners and underwriters.

It is obviously too early to determine to the last cent just how much can be saved by the adoption and use of these small trucks. The labor item is the most important one, and it has been found that where the trucks can be kept busy and the hauls average 200 to 800 feet, that each truck will displace at least 4, and often 5 and 6 men each. They can make from 20 to 30 miles on a single charge, while boosting during noon hour will increase this mileage one-third. Although the initial cost of the electric industrial truck, which is $1000 to $3000, looms large when compared to the cost of hand-powered equipment, it will save its first cost in 4½ months with careful operation, and if a machine will pay for itself in this short time, what does it matter whether it costs $1000 or $5000? With enough work to keep it busy, and with careful operation, the economy and capacity of the "Electric Stevedore" is very remarkable.

RIVER STEAMERS TO CONTINUE.

"The Sacramento steamer may be retained and operated by the Southern Pacific Company, according to press dispatches from Washington, which report the decision of the Interstate Commerce Commission granting the application of the railroad to continue this service.

"Under the Panama Canal Act, railroads are forbidden to operate or own steamer lines which run through the Panama Canal 'or elsewhere' unless permission is given by the Interstate Commerce Commission to do so; and this permission must be based upon the showing that the continuance of the service is 'in the interest of the public and is of advantage to the convenience and commerce of the people,' and will neither prevent, exclude, nor reduce competition on the water route concerned.

"The granting of this permission to the Southern Pacific Company is considered remarkable in view of the denial of the Interstate Commerce Commission of permission to the eastern roads to continue the operation of the steamer lines plying between ports on the Great Lakes, which was recently announced. The Commission also recently refused the Spokane, Portland & Seattle Railroad permission to continue the operation of a steamer line between Portland and the Dalles, on the Columbia River.

"While the detailed reports of the Commission's decision have not been received, Southern Pacific officials feel sure that the granting of permission is the result of the very strong public support which was given to the application by the people of Sacramento and by the fruit and vegetable growers and other common interests along the Sacramento River.

"At the hearing of the case in San Francisco last August, Commissioner Hall, assisted by Examiner Cutheim, made a thorough investigation into the service, rates, conditions of competition and all results of past operation of these boat lines. At this hearing, a number of merchants from Sacramento testified that the service was of the greatest benefit. They asserted positively that the refusal of permission to continue their operation would be a severe blow to the city of Sacramento and its tributary towns, and to the large delta land in the Sacramento basin which is served by no other transportation than water carriage. The hearing was probably the strongest public tribute given by patrons of a common carrier ever presented to the Interstate Commerce Commission."

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NONSENSE UNDEFILED.

THE May issue of The Architect and Engineer contains an article on marine safety written by F. W. Fitzpatrick, one of the magazine's contributing editors. The article in question is utterly unworthy of an answer except for the fact that it is apt to put false ideas into the heads of some of its readers. Mr. Fitzpatrick is evidently an architect and as such he should possess professional honor enough not to attack the ability of the members of another profession of whose business he proves himself to be absolutely and unmistakably ignorant. The article in question is reproduced below and anyone who knows port from starboard will immediately see the injustice of Mr. Fitzpatrick's contentions:

"What an appalling lot of additions have lately been made to our list of marine disasters, by accident and by war! The recent wreck of the 'Hanalei' near Point Bonita, Cal., resulting in the loss of many lives, has, like so many other catastrophies of a similar nature, resulted in the usual long drawn-out inquiry and owl-like finding that such an officer was to blame for a collision or malnavigation. In a round-about sort of way that officer may have been to blame, but the real culprit is, it seems to me, the system of construction of our ships. I can't for the life of me see it otherwise than a horrible crime to permit the sending of a thousand or more people to sea with nothing but a half inch of steel between them and eternity!

"In our great ships of to-day, where hundreds of thousands of dollars are spent in decoration, in supplying endless luxuries of travel and more or less useless frills, the very first principle of naval construction seems sorely neglected. The veriest landlubber must recognize that that first principle is to build something that will stay afloat. These leviathans of the sea will of course float under certain circumstances, but the circumstances under which they will not float are so many and so apt to occur that we are forced to the conclusion that the naval architects are still a bit wobbly as to construction.

"It took twenty-five years for the land architects to realize that wood would burn and that to build unburnable buildings they had to eschew wood and inflammable materials and those that though unburnable were damageable by fire. And so with our naval achitects, it is taking them a long time and awful lessons, involving terrific loss in life and property, to learn that the first and most important function of a ship is to stay afloat however rammed or banged-up it may be. Speed, luxury, economy in construction, all those are secondary considerations.

"To-day ships have a double bottom in certain parts, water-tight compartments here and there—made so by doors that in an emergency may or may not work and that in any event depend upon human forethought for their closing—bulkheads, fore or aft or amidship and all that sort of thing. If a vessel is compartmented fore and aft, she is liable to be rammed amidship, and down she goes and the public is surprised and horrified; if she is bulkheaded amidship, she'll some day poke her nose on the rocks in a fog and only a handful of her people can be taken off; or if she is amply protected in both particulars she probably will have but a paper-shell keel and rides up on an iceberg and rips herself open—witness the 'Titanic,' and there you are, some one or more vulnerable parts forgotten or neglected. Talk about the 'great crimes of the age,' is this not one of the greatest?

"It has long been hammered into our naval engineers—but to little avail—that all that they do in the way of elaborate, complicatedly closing water-tight compartments, bulkheads, vertical divisions, inner shells and what not, is quite necessary and highly commendable, but that still more is imperatively necessary. Air-spaces that are always closed; great, horizontal buoyant safeguards, added to what they are already doing, are what will finally insure protection to life.

"Instead of the usual section of deck-beams used in ship-building, why not use a deep, light, I-beam of equal metal, then the customary deck plates on top and thin ceiling plates below. There you have a perfect air-space enclosed between every two beams and as wide as the deck. It might even be wise to cut up these spaces with little cross di-

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visions so as to make as many small units as possible. Break into one or two or more spaces, but there is all the rest of the buoyant deck floor space that will supply its share to the buoyancy of the whole. Rip off the prow or stave in the vessel's side or punch a hole in her keel and she may go down and down, submerging deck after deck, but she'll still stay afloat with perhaps but her top deck out of water, but that is sufficient area for the passengers to occupy in safety until taken off by other vessels.

"Make your deck but fifteen or eighteen inches thick and figure up the air space that that will give you, the buoyancy insured by five, six or eight decks bound together by hull and vertical supports, all over and above and beyond the customary chambers and air-spaces that are susceptible of damage and you will be surprised at the vast increase in the amount of buoyancy you will have secured, and absolutely tight buoyance, not anything that has to be closed off in an emergency, but something that is always ready."

Mr. Fitzpatrick has not discovered anything new. Double decks were thought of, worked over, figured on and given up some few years before he was born. With six complete double decks, according to Mr. Fitzpatrick's idea, a vessel would have to be about three feet deeper to retain her carrying capacity, and the weight of that three extra feet of side, plus the weight of his steel ceilings, plus the weight of water-tight hatches wherever an opening occurred in a deck, plus the weight of extra staple work where the ceilings were worked around gusset plates, would just about use up all the extra buoyancy secured. It is true enough that if the decks were three or four feet apart and water-tight, that the ship could be made, to all practical purposes, unsinkable, but who would operate such a ship? When a fireproof building gets to burning, the elevator shafts serve to keep up a splendid draft, thus insuring considerable damage and in many cases loss of life. Would Mr. Fitzpatrick design a skyscraper without elevators? The naval architect has nothing to fear from a comparison of the advance of his art during the past one hundred years with the art of the building architect, and if Mr. Fitzpatrick can produce figures to prove that a man is any safer in his own home than he is at sea we would like very much to see them.

THAT SAFETY AT SEA MYTH.

In referring to a speech made by Senator James D. Phelan on May 26th, occurs the following: "The Senator then went on to say that the decline of the American merchant marine was due, to a great extent, to the insecurity of life at sea. He added that some guarantee as to life must be as drastic as that relating to shipping interests."

We believe that the "Examiner" reporter garbled this as Senator Phelan is hardly the man to make such ridiculous statements. Insecurity of life at sea is a myth and the fear of disaster does not keep one in a million from traveling either on sea or on land. Of the two, sea travel is the safest, according to statistics. If Senator Phelan has been quoted correctly he has given utterance to an opinion that is about as foolish as a statement would be to the effect that fear of earthquakes would depopulate San Francisco. The news of the torpedoing of the "Lusitania" had no effect on the passenger lists of the next boat, because the average traveler realizes that he is just as safe on board ship, even in war times, as he is almost anywhere else. If insecurity of life were any cause for an effect, the western boundary line of the United States would still be the crest of the Allegheny mountains, for life beyond this line was extremely insecure. Security of life at sea has advanced wonderfully during the past one hundred years and as far as this country is concerned the advance has been made despite shipping laws and regulations rather than on account of them. In other words the law has followed improvements rather than led to them.

CONGRESS AND THE SEAMEN.

April 13th, 1915.

To the Editor of American Industries:

Sir:—I have read with pained interest your editorial in April number—"Freeing the Seaman." It is impossible to believe that you are ignorant of certain facts that are ignored in your writing. The so-called Seaman's Act was not operative before its passage and therefore is not responsible for any fact that existed prior thereto. Won't you please tell your readers, "What were the causes of those facts, and what remedy you would prescribe." The facts were these: The United States had no merchant marine except her coastwise and inland vessels; the United States had no promise or prospect of any merchant marine, other than her coastwise and inland merchant marine.

In what way do you hope to aid American industries by denunciation of the only act passed in twenty years, whose purpose was to revive our overseas shipping and yet suggesting nothing by way of remedy. Don't you think it just possible that the men in Congress who passed this law, believed it a good one and that it might be possible they are as wise as you, and furthermore, what harm can it do to our overseas shipping since at present we have none?

Yours truly,

(Signed) RUFUS HARDY,

Member House Committee on Merchant Marine.

Congressman Rufus Hardy has allowed himself to become peeved over the widespread criticism of

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the Seamen's Act, so peeved indeed that he wilfully makes the misstatement, "What harm can it do to our overseas shipping since at present we have none?" Of course every man, even a Congressman, is entitled to his own opinions, but no stretch of the imagination can bring us to Mr. Hardy's viewpoint when he characterizes the Seamen's Act as "The only Act passed in twenty years whose purpose was to revive our overseas shipping."

It may be that we are criticizing Mr. Hardy with only a half knowledge of his motives. It is just possible that he is more than a politician, he may be a statesman. We cannot bring ourselves to believe that Mr. Hardy is of the opinion that the Seamen's Act will directly revive our overseas shipping unless the worthy member of the House Committee on Merchant Marine figures that by utterly destroying the meagre American fleets engaged in the foreign trade at the present time a sentiment will be created throughout the country that will result in a strong reaction in favor of shipping. If the Seamen's Act is meant as a temporary dose of chloroform administered for the purpose of awakening the public to the precarious state of our foreign trade shipping, then we can glean some reason out of Mr. Hardy's letter quoted above, but if the Congressman looks upon the Seamen's Act as a healthful tonic, why all we say is, "Quick Watson, the needle."

OUR NAVAL NEEDS.

Elsewhere in this issue will be found an address by Rear Admiral Fiske on the condition of the United States Navy. The Rear Admiral's position and standing entitle his remarks to very careful consideration, and there can be no doubt of substantial foundations for the majority of his assertions.

To the outsider there appears to be several weak points in the American navy viewed as an offensive force. During the present war England was enabled to dispose of the German commerce destroyers through the use of superior force and equal or superior speed. What vessels would the American Navy despatch on such a mission? Again, in a running sea fight between the dreadnoughts of our own and any powerful foreign navy, would the heavier armor of the American ships offset the tactical advantage of speed that would be possessed by our opponents? This is a question upon which a layman would naturally hesitate to voice an opinion, but there is one weakness in a fleet of slow battleships which must be apparent to any one. If two foreign dreadnoughts caught one American dreadnought, by all the accepted rules of sea warfare and according to the European war experience, the American vessel would be sunk while, on the other hand two American dreadnoughts could not sink one foreign dreadnought unless they chanced to surprise their prey at close quarters,—a possibility that is extremely remote.

The dropping of bombs from Zeppelins and air craft has not proven much of a factor in the present European war, it is more spectacular than efficient, but the value of the aeroplane for scout duty and range finding has exceeded all expectations. The German army has found the aeroplane highly valuable in this regard and the English dreadnought "Queen Elizabeth" succeeded in sinking a transport completely hidden from the ship at the third shot, the fire being directed from an aeroplane.

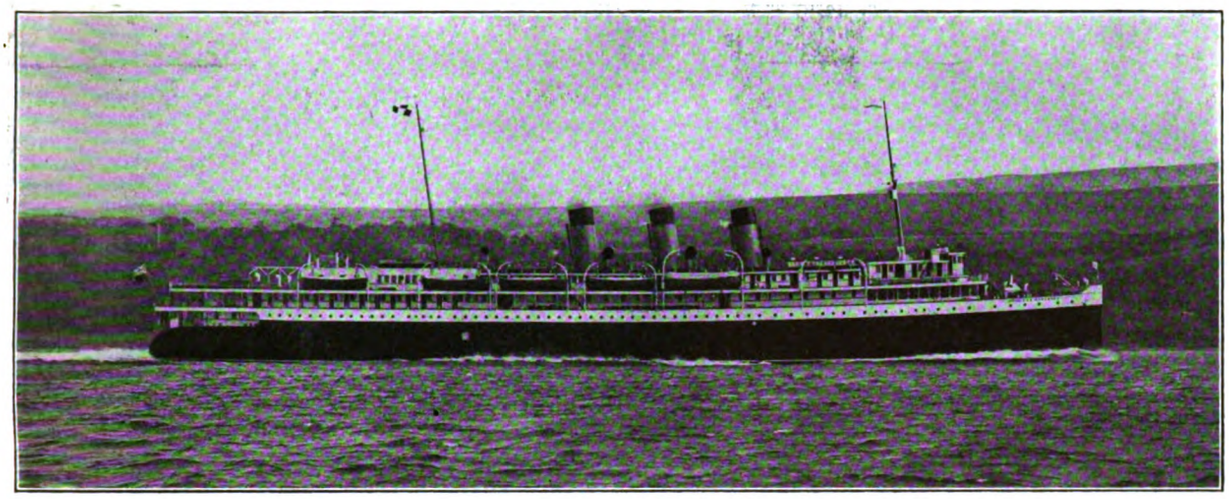
Universal disarmament may come at some far distant date, but until it does come and so long as the United States is an unmilitary nation, we owe it to ourselves to make the landing of a large hostile force upon the American continent an impossibility. The cost to this country of one semi-successful invasion would offset a hundred times over the cost of bringing our Navy to such a condition that no foreign power would attempt to land an expedition on American soil.

At a dinner given by the Merchants' Association of New York to the visiting Honorary Commercial Committee of the Republic of China, Mr. Charles M. Schwab struck the very center of our foreign trade difficulties when he said: "No nation in the world manufactures as well as the United States. No nation in the world sells any better or as well; but of what importance is it to manufacture or to sell if we cannot deliver the goods? In the manufacture of steel one-third of the cost is in transportation. What is true of steel is true of other manufactured products. The ability of other nations to take advantage of that one-third of the cost gives them precedence in the commerce of great nations like China."

The Marigold Dredging Company, which operates near Marysville, has ordered a large gold dredge from the Union Iron Works.

Sealed proposals will be received at the office of the Superintendent, Coast and Geodetic Survey, Department of Commerce, Washington, D. C., until August 10, 1915, and then opened, and also on the same date at the office of the Inspector, Coast and Goedetic Survey, Room 310, Custom House, San Francisco, Cal., for construction and equipment of Coast and Geodetic Survey steamer "Surveyor," of about 1,000 tons displacement. Particulars may be obtained upon application to the Superintendent, Coast and Geodetic Survey, Washington, D. C.

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The "Princess Irene." This fine new coaster for the Vancouver, Victoria, Seattle run was destroyed by an explosion while in the service of the British Government.

THE WAR BROUGHT HOME TO US.

The great European war has been brought forcibly home to the shipping of the Pacific Coast by the destruction of the "Princess Irene" and the torpedoing of the "Nebraskan."

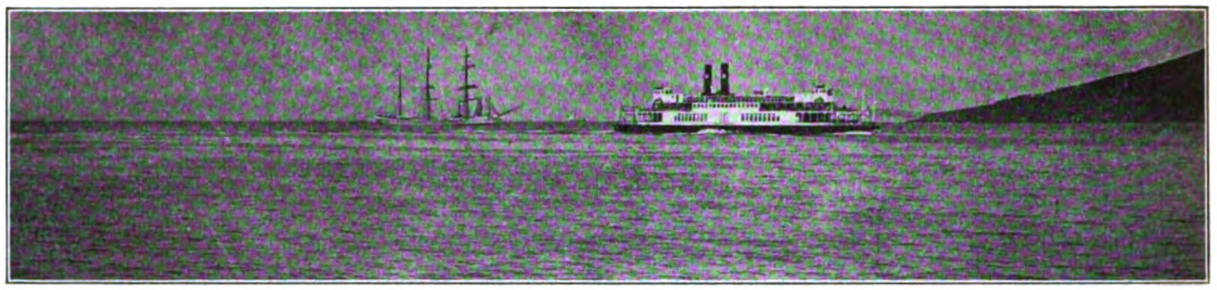
The "Nebraskan" left Liverpool for New York in ballast on May 24 and was torpedoed on the evening of the 26th about forty miles west of Fastnet. She managed to get back to Liverpool under her own steam with her foreholds flooded. The "Nebraskan" was built in 1902 by the New York Shipbuilding Company to the order of the American Hawaiian Company. The latter concern had chartered the vessel into the transatlantic service and at the time of the attack upon her she was returning to New York, and was from there to go to Newport News and load Government coal for the west coast. The "Nebraskan" is a two-decked, steel, twin screw steamer 360 feet long, 46'-2" beam and 27'-2" molded depth. She is an oil burner, fitted with two Scotch boilers and two sets of triple expansion engines, with cylinders 19, 31 and 54 inches in diameter and 42-inch stroke. It is worthy of note that both the "Gulflight" and the "Nebraskan" did not sink when torpedoed and that both these vessels were built at the New York Shipbuilding Company's plant. The departure of the "Nebraskan" on her first east-bound trip through the Panama Canal was made the motif for a waterfront celebration at San Francisco, the vessel being accorded the honor of San Francisco's official Panama Canal ship.

The "Princess Irene" was blown up in Sheerness harbor on May 27, her crew and workmen who were on board being annihilated. The "Princess Irene" and the "Princess Margaret" were sister ships built by William Denny and Brothers of Dumbarton to the order of the Canadian Pacific Railroad. The vessels were intended to maintain a splendid service between Vancouver, Victoria and Seattle, but the war broke out just as they approached completion and they were both commandeered by the British Government. The "Irene" was 395 feet long, 54 feet molded beam and depth 28 feet to upper deck. The fittings and decorations in the public rooms of this vessel were sumptuous in the extreme, and with her sister ship she was intended to set a high mark in the Canadian coasting service. Steam was furnished by ten Babcock and Wilcox boilers and the propelling machinery consisted of two sets of Parsons geared turbines operating on the compound system, each set comprising one high pressure ahead turbine, one low pressure ahead turbine, one astern turbine and one set of gears. The "Irene" developed great speed on trial, making 23.15 knots with the engines indicating 14,000 horse-power.

It is stated that the new Union Steamship Company of New Zealand's liner, the "Aotorea," will be taken over by the British Government. The new craft might be described as an improvement in size and appointments over the Union Steamship Company's splendid and popular steamer, the "Niagara."

On her last trip to Australia, the "Niagara" left Vancouver minus the propeller on her center shaft. This vessel is engined with two reciprocating engines on the wing shafts exhausting into a low pressure turbine on the center shaft. One blade of the central propeller had been stripped on the way over from Australia and this propeller was removed at Vancouver. The vessel will be dry-docked and a new propeller fitted on the other end of her run. It is expected that the "Niagara" will experience no difficulty in maintaining her 16-knot schedule with the two reciprocating engines.

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Pacific Coast Shipping Notes

The recent conferences between the Alaska steamship companies and the labor unions brought out the fact that no one knows just what effect the Seamen's Act is going to have on operating costs and for this reason no basis of adjustment could be agreed upon. It is noteworthy that the Sailors' Union of the Pacific, while it took part in the conference, did not make any demand. The Seamen's Act clothes the Sailors' Union of the Pacific with immense power and it is evident that the sailors do not care to enter into any binding agreement until after November 1st, on which date they will be in a much better position to dictate terms than ever.

The Pacific Coast Coal Company's retail and tug boat coal bunkers at the foot of Dearborn street were swept by fire on June 4th. The damage amounted to nearly $100,000, entirely covered by insurance. The destruction of the bunkers did not hamper the big coal concern to any great extent.

It is rumored that the Transports Maritimes Company of France is contemplating a monthly San Francisco service to Marseille via the canal.

"Fairplay," a London shipping publication, takes the following rather amusing liberty with our geography in its May 13th number: "Until one comes close to the west there is little to watch from your carriage windows, but at Port Custom the train is carried bodily across an arm of the sea in a big ferry boat, etc."

Edward C. Judd, C. G. Wilson and Captain J. Speier have been appointed State pilot commissioners by the Governor of Oregon. The appointments are for two-year terms.

The ruling of the Interstate Commerce Commission preventing the Associated Oil Company from operating tank ships between California oil ports and Portland has caused considerable speculation as to how the city's crude oil supply will be handled in the future. Portland has been taking about 400,000 barrels of crude oil per month and the Associated Oil Company has been supplying about 75 per cent. of the supply. In this connection it is pointed out that the Shell Oil Company of California, the local organization of the Dutch Shell Company, are making every preparation to enter the Northwest field.

Three 10,000-ton and two 6000-ton deadweight carriers have been chosen to inaugurate the new Norwegian line to Seattle. A monthly service is planned. Captain Fritz Olsen, of the Fred Olsen Line, has been visiting west coast ports for the past two months, making arrangments for this new service.

The "Manila Maru" and the "Hawaii Maru," two new boats intended for the Japan-Puget Sound route, were recently launched at Kobe and Nagasaki. These vessels will have a speed of 17 knots, a cargo capacity of 11,000 tons and accommodations for 300 steerage and a limited number of first-class passengers. They are 495 feet long, 65 feet beam and 30 feet depth of hold. Both vessels are equipped with very powerful cargo handling machinery having hoists capable of negotiating 40-ton weights.

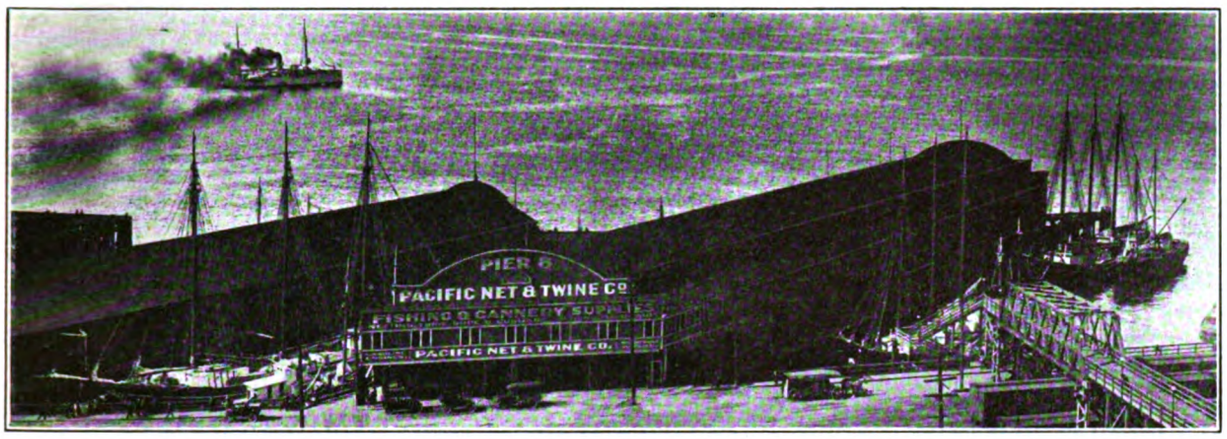
The statute exempting from taxation Washington registered ships plying between their home ports and other States and countries is unconstitutional and void, according to a Washington State Supreme Court decision handed down in upholding a tax of $997.40 against the steamship "Elihu Thompson," owned by the Pacific Cold Storage Company and registered at Tacoma.

Through arrangements with the Ward Line it is now possible to ship goods on through bills of lading at through rates from Hawaiian Island ports, Seattle or other Pacific Coast ports via the American-Hawaiian Steamship Company direct to Havana. The steamship companies take full charge of the freight and attend to the transshipment at New York.

The American-Hawaiian Steamship Company has decided to name the three new boats building for the coast to coast fleet, "Floridan," "Arborean" and "Artisan." The "Floridan" replaces the "Washingtonian," and the departure from "State" names for the other two vessels is probably for the purpose of designating their specialty as large lumber carriers.

The steam, stern-wheel tender "Woodland" was launched at Supple's yard on June 6th. The

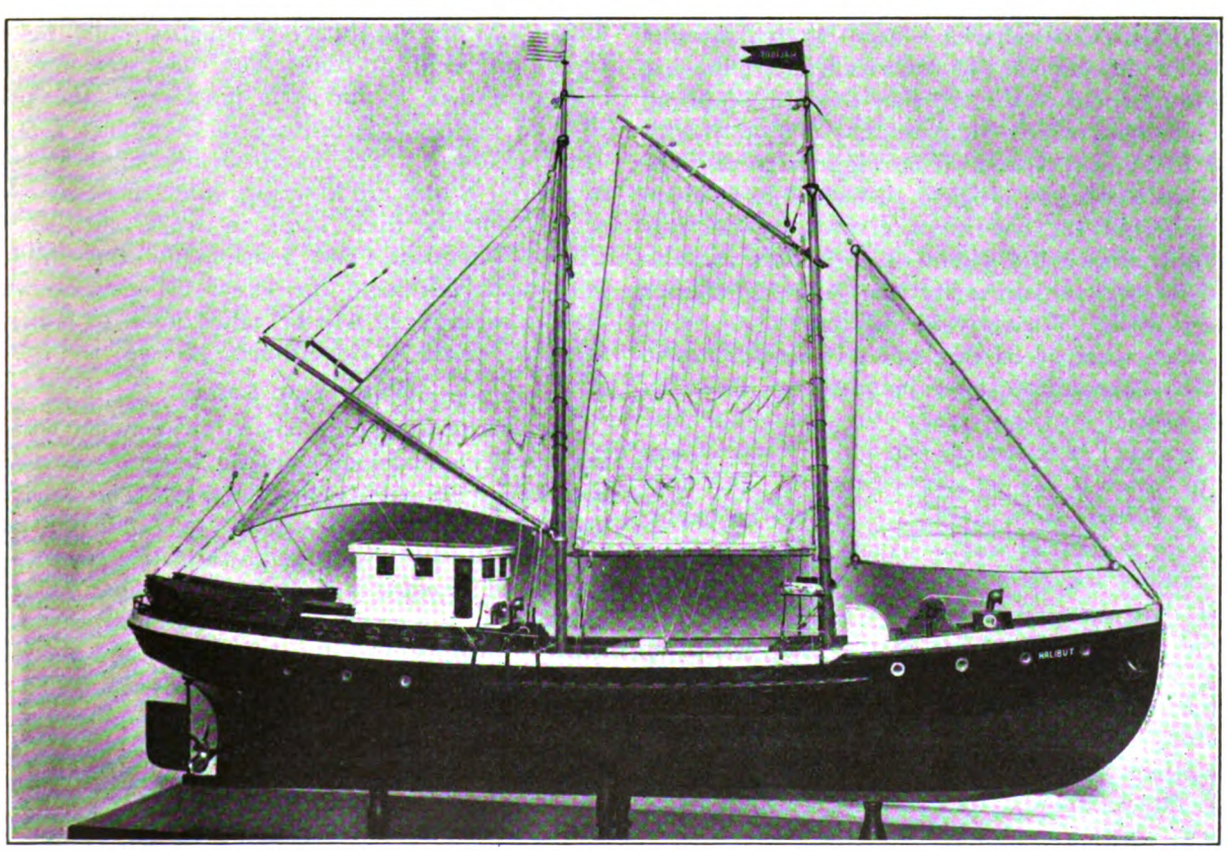
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The location of the Pacific Net and Twine Company is an ideal one from every point of view.

"Woodland" has an overall length of 97 feet, beam 20 feet, molded depth 4 feet. She will be driven by the usual type of stern-wheel engine with cylinders 10 inches in diameter by 4 feet stroke. The engine and boiler of the "Woodland" are being constructed by the Willamette Iron and Steel Works, which concern is also now ready to receive the final acceptance for the government dredge "Monticello." This latter craft is a combined bucket and suction dredge. The suction is 10 inches in diameter and the clam-shell bucket operates from a boom 70 feet in length. Tests were started on the dredge on June 12th and it is expected that the long test runs prescribed by the Government will be completed and the craft accepted by July 12th. The price of the "Woodland" is $16,978 and that of the "Monticello" $27,830.

The annual report of the Board of Trade of Prince Rupert makes a most attractive and interesting booklet, describing as it does, a town that is scarcely seven years old, but already of considerable and rapidly growing importance. As an advertising medium it has one peculiarity that we seldom see in this neck of the woods and that is the taxes are played up as one of the region's attractions. Not many localities are in a position to advertise their tax rates.



The "Halibut." This faithful model of the modern halibut fishing schooner exhibited by the Pacific Net and Twine Company is attracting wide attention at the Exposition.

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European Marine Notes

[From our own Correspondent.]

London, June 5th, 1915.

THE present war held up a lot of things which should have matured by this time, but directly things are settled down shippers here expect a lot of trade between the United Kingdom and Pacific Coast ports. This will be especially strong in connection with the timber trade. An American consul here has furnished your correspondent with some views that are interesting. From his statement the following extract might be repeated as of special interest to your side. He points out that already the lessened imports of timber from Baltic ports to this country have induced some of the leading importers to order large quantities of California seasoned redwood, and British importers are at present considering the possibility of their handling American soft woods of all kinds. Contracts have been entered into recently for the shipment of American pitch pine and Oregon pine, cut to the ordinary Swedish scantling sizes, at prices which compare very favorably with those for Baltic woods. The high price of California redwood has hitherto restricted its sale on this side, but the conditions created by the war have now drawn the attention of dealers to it as a satisfactory substitute for the highest qualities of Russian fir. Formerly it was too full of moisture when received on this side. It now comes in a seasoned condition, after having been dried by some special process, ready for immediate use upon arrival. It is sure to find a ready sale at any port to which it can be shipped direct. The stoppage of exports from Russia also offers an opportunity for American shippers of pitch pine to find new outlets for this useful wood. It has been stated that some of the railway companies have ordered pitch pine sleepers in place of those formerly obtained from Riga. The mining districts consume considerable quantities of pitch pine, and the British Government at present is using it in the construction of officers' huts in the training camps that are now dotted all about this country.

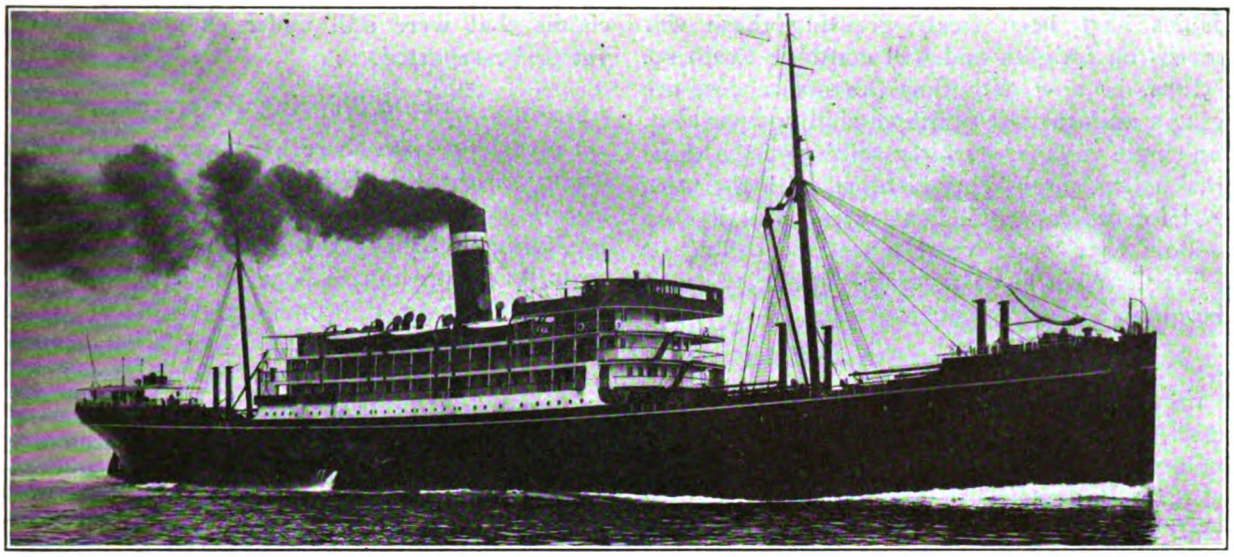
The British Admiralty and Shipowners.

British shipowners have now been asked to keep the Admiralty informed of the movements of their vessels and so assist it in proportioning the percentage of requisitioned tonnage according to the size of the fleets. This request is the outcome of representations made to the Director of Transports at a meeting some weeks ago and cordially received by him. It is heartily welcomed by the great majority of owners. For months past freights obtainable in the open market have been far above the Admiralty rates, and if occasionally there has been dissatisfaction it has been mainly due to the fact that the Government demands have fallen unequally on owners. Reports have been current that some small ownerships have had the majority of their vessels requisitioned, while only a small proportion has been taken from larger fleets. All owners admit that, since the Admiralty requirements may be imperative, inequality must be expected to occur at times, but they welcome the assurance that, as far as is practicable, the principle of taking a percentage of each fleet is now being followed. The exceptionally high freights in neutral trades are a strong inducement to owners to employ their ships in trade outside the United Kingdom, and presumably the present movement will have the effect of ensuring that vessels so engaged will be called upon to contribute their quota to Government service.

White Star Losses.

The White Star Line has to be included among the small company of shipping lines whose earnings have been vitiated by the war. The working profit has fallen by $1,430,000 to $3,975,000, and the final dividend is passed, while the amount to be carried forward is $307,995, as against $453,350 brought in a year ago. The directors say that since November both the "Olympic" and the new liner "Britannic," which could have been ready for service at that time, have been unemployed, and consequently capital representing $15,000,000 has also been unemployed, in addition to which laying-up expenses have been incurred. The laying-up of the "Olympic" is attributed to the closing of Southampton to ordinary traffic. So presumably,

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The British India Steam Navigation Company's new passenger and freight steamer "Mongara."

as in the case of the Royal Mail Company, a claim for compensation will be submitted to the "Committee for the Diversion of Shipping in Time of War."

Dearer Ships.

In consequence of the shortage of tonnage—many more vessels have been requisitioned by the Admiralty—the price of merchant ships continues to increase. The latest instance of this upward tendency is that a steamer has been sold to a Portuguese company for $320,000, although her sister-ship was bought last June for a little under half that amount. Another steamer, which was built 21 years ago at a cost of $140,000, has just changed hands at $135,000, although her actual value before the war could not have been more than $25,000. A curious feature of the boom in freights is the entry of merchants and manufacturers into the ranks of shipowners. The South Metropolitan Gas Company, for instance, has bought six steamers, while several other firms have followed its example, one of them on a fairly large scale.

Another remarkable instance of the high prices now paid by owners for tonnage occurred on May 20th when the Norwegian steamer "Risöy," of 1,129 tons gross, now lying damaged in the Surrey Commercial Docks, was sold by auction at the Baltic Exchange for $60,000. The steamer was built six years ago at Bergen for about $75,000. But the price paid on May 20th appears extraordinary when the special circumstances of the sale are taken into account. Messrs. Lachlan, the auctioneers, explained that the "Risöy" was sunk off the Nore on March 4th, while outward bound to Genoa with a general cargo, as a result of a collision with the British steamer "Warsaw." The "Risöy" was afterwards lifted to an upright position by the Port of London Authority by means of wires, parbuckled, patched, and towed into dock. The funnel and the two masts went overboard, and the vessel was seriously holed. To what extent the bottom is damaged is not known even yet, but it is certain that a heavy outlay will be needed to make the ship seaworthy. Still, bidding at the sale was very keen, and the buyers for Norwegian account have excellent means of judging the value of tonnage, with freights as high as they now are.

High Shipbuilding Costs.

When the first iron screw collier was built by Palmers at Jarrow, some 60 years ago, the prices of shipbuilding materials were then at high levels, and now in these days of steel and quick production they are actually at almost the same level. It is probable that prices have never been so high during the whole transition from wood to iron as they now are. This, together with the shortage of labor and the increasing standing charges owing to the slower rate of production, makes a formidable combination of adverse circumstances which will be evidenced in forthcoming balance-sheets, and dispose of the opinion held in some quarters as to the "fabulous" profits now falling to the shipbuilder.

Freights as an Insurable Interest.

Another development is now being put into practice by the war risk clubs, but without Government collaboration. The clubs are recognizing "freights" as an insurable interest. Although freights are now very high, only a varying proportion of them represents profit. Before an owner actually earns his freights for the carriage of, say, wheat from Argentina to this country he has to make a heavy outlay on wages, coals, stores, etc.; in fact he has to pay for the working of his ship. All the expenses he has to incur have been rising steadily, and the owner, in order to avoid the risk of their having been made in vain, has sought to insure against the risk of an accident. Both underwriters at Lloyd's and the insurance

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companies have been freely granting these war insurances on freights and will continue to do so. The clubs, in now accepting the insurances, are charging a uniform rate of fifteen shillings per cent. for the single voyage, or thirty shillings for a three months' policy, these being identical with the rates charged for ordinary hull insurances. But it does not follow that when vessels are not calling at these islands even more favorable quotations may not be obtainable in the open market.

Norwegian Shipowners' Association.

At the annual meeting of the Norwegian Shipowners' Association it was announced that at the beginning of the year the roll of membership comprised 278 shipowners, representing a total of 2,083,409 tons of shipping, an increase of 192,000 tons as compared with the previous year. In his opening address the president referred to the growing importance of the Diesel motor, especially for the Norwegian shipping trade, and stated that quite recently a considerable number of motor vessels had been ordered for construction at Norwegian yards. A resolution in favor of the establishment of a ship mortgage bank was adopted. The preparatory work it was stated had already been begun, so that the foundation of that bank could take place as soon as the opportune moment arrived. A report was made on the first eight months' working of the State war insurance. During that period the sum of 5,500,000 kronen had been received in premiums and 298,000 kronen paid out as compensation for damage, leaving a balance of over 2,000,000 kronen for the settlement of claims that were still under examination or had yet to be reported.

Chinese Shipping Enterprise.

For a long time there has been a movement in China for the establishment of steamship lines to Europe and America. Four years ago a company was formed at Shanghai to trade with Pacific Coast ports, but not a single boat was run by it. Now, however, largely, it is understood, in consequence of the withdrawal of German and Austrian steamers from Far Eastern waters and the great shortage of tonnage there, several wealthy Chinese merchants, with the support of the Government, intend going into the shipping business on a big scale, although at first chartered vessels will be employed. Services are to be maintained with Great Britain and other European countries, as well as the western seaboard of the United States, while it is also intended to develop coastal traffic in competition with Japanese companies.

Recent Launchings.

I give an interesting photograph of a ship recently built at Wallsend-on-Tyne by Swan, Hunter, and Wigham Richardson, Ltd. The S. S. "Mongara" was built for the British India Steam Navigation Company, Ltd. Her leading dimensions are 464 feet in length overall, with a molded breadth of 58 feet and a depth of 36 feet, and her gross tonnage is 8205. She has twin-screw, triple-expansion engines. She has most comfortable accommodation for a large number of first-class passengers in addition to space for cargo.



New York Notes

ANXIOUS to extend their commercial relations with the United States and believing that the first step in this direction is the establishment of adequate steamship service, the Imperial Society for the Promotion of Commercial Navigation at a meeting held in Moscow, decided to send a representative to New York for the purpose of making the necessary arrangements. The Russian trade is of growing importance and with the port of Archangel open for nine months in the year, as the Russian Government claims it will be, a direct service with New York is already under consideration.

It is so seldom that a vessel flying the Chilean flag visits the United States that the presence of one in Philadelphia recently attracted wide attention. The vessel was the "Teno," of 2,622 gross tons and owned by the Compagia Sug America de Vapor. She came from Valparaiso.

The steamer "Lillie," a banana-carrying vessel well known along the Atlantic coast and in the West Indies, has been sold by the Donald Steamship Company of New York to the Limerick Steamship Company, of Limerick, Ireland, for a sum said to be approximately $90,000. She has been renamed the "Aylevarroo."

In a report submitted by the Belgian steamer "Lydia" to the Hydrographic Office in Washington,

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the merits of oil for calming a heavy sea are interestingly set forth. From February 18 to February 22, and beginning in latitude 40, longitude 64.30, the "Lydia" spread fish oil over the water by means of bags placed in closets forward, aft and on each side amidships. The sea began to break at once, the report read, and it is believed that the vessel escaped much damage as a result of these measures. About eighteen gallons of oil were used during the five days.

The Bath Iron Works at Bath, Me., have launched the steel steamer "Emblane," which will be devoted exclusively to the purpose of testing torpedoes by the E. W. Bliss Company. The "Emblane" is 130 feet long and of 308 tons registry.

A new steamship operating corporation has been registered in London, with a capital of $100,000, to carry on in the United Kingdom, the Colonies, the United States, South America and elsewhere, the business of shipowners, shippers, ship and loading brokers, managers of shipping property, dock owners, ship repairers, etc., and to adopt an agreement with Messrs. Houlder Brothers and Company, Ltd., for the acquisition of certain vessels.

Captain Thomas E. Gilett, formerly surveyor for the Board of Underwriters of New York and widely known among shipping men, has left for Jacksonville, Fla., where he will reside permanently. Captain Gilett expects to carry on a business as ship or cargo surveyor and general adviser on marine matters at Jacksonville, Tampa and other ports of Florida.

Every vessel in the Standard Oil fleet is to be equipped with the Dahl oil burning system, according to A. W. Christian, the Eastern representative of the Union Iron Works of San Francisco, who has closed the contract for the installations. Several of the Standard Oil Company vessels have already been equipped with the system, it is said, and the new contract is the outcome of the satisfactory results which were obtained.

The Dutch merchantman "Woudrichem" entered New York harbor recently after a tempestuous voyage from Rotterdam, with a wooden funnel and bearing other marks of the battering she had received. Her iron funnel was lost off the Azores and unable to obtain the necessary repairs, the makeshift funnel of wood lined with sheet iron was erected. Aside from catching fire several times it served to good purpose on the remainder of the voyage.

At an organization meeting held by the board of directors of the Maritime Association of the Port of New York, John Dowd was reelected secretary for the ensuing year. William Harris Douglas and Daniel Bacon were elected members of the executive committee. Bernard Tim and Edgar F. Luckenbach were appointed members of the finance committee and C. L. Bundy was elected to succeed himself as superintendent.

With profits for 1914 of £91,000 as against £431,000 for the previous year, the Royal Mail Steamship Company seems to be in much worse condition than the passing of dividends indicated. The company is suffering greatly by the closing of Southampton harbor and also by the general depression existing in South America.

Officials of the Panama-Pacific Steamship Company, operating the American steamships "Finland" and "Kroonland" between New York and San Francisco, express themselves as feeling highly gratified over the prospects of both a lucrative cargo and passenger business between the two ports. The "Finland" steamed from this port on her first voyage with 350 cabin passengers and might have had as many more had the company been able to accommodate the additional requests for passage. The "Kroonland" was also booked full long before the date set for her departure.

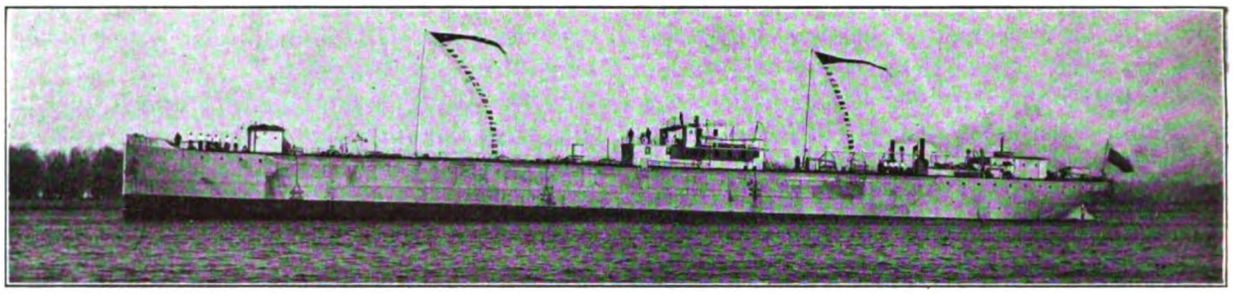
The annual complimentary luncheon of the maritime section of the Navy League of the United States, held at Kuchlin's Restaurant at No. 76 Broad street, New York, on May 6, brought out more than ninety members of the organization. C. B. Parsons presided and five-minute speeches were made by Captain Reginald Fay, superintendent of the marine department of the New York Central Railroad; Dr. George Sidney Webster, secretary of the American Seamen's Friends Society; Alexander R. Smith, and Dr. Edward R. Breck, field secretary of the Navy League. The following officers were unanimously re-elected: C. B. Parsons, chairman; Samuel Rowland, vice-chairman; J. V. Barnes, treasurer, and John Dowd, secretary.

A director of the Hamburg-American Steamship Company, in a statement made recently in Berlin, declared that contracts have been let for seven new steamships each with a capacity of 17,000 tons, in anticipation of heavy passenger and freight business which is expected to follow the war. Representatives of the company in New York were unable to confirm the statement.

The death of A. L. Hopkins on the "Lusitania" will be deeply felt by marine engineers and naval architects throughout the United States, for while Hopkins had made a high mark for himself he was still comparatively a young man with the best years of his career before him. The Newport News Shipbuilding and Dry Dock Company has lost three presidents since 1911—Messrs. Orcutt, Post and Hopkins.

Up to April 1st, the American-Hawaiian Steamship Company transported over one-fifth of the total freight carried through the Panama Canal.

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Shipping Notes

A line of freight steamers, using carriers of about 7000 tons deadweight capacity, is being started by Furness, Withy & Company, between New York and Cardiff. The vessels will be run as often as business warrants.

The recent annual meeting of the Norwegian Shipowners' Association brought forth the report that there was now 2,083,409 tons of shipping belonging to members, an increase of 192,000 tons over last year. The growing importance of the motor ship and the formation of a Norwegian ship mortgage bank were the principle topics of discussion at the meeting.

"Every big shipyard in the country is extremely busy," said William C. Redfield, Secretary of Commerce, recently. "This does not include, of course, the tramp yards, as I have no information regarding them." The above is quoted from "The American Marine Engineer," and we presume that Mr. Redfield is quoted correctly. The Secretary is quite right in his statement, albeit a little late in discovering the fact, but what we would like to know is what does he mean by "tramp yards"?

The Mexican Navigation Company of New York has contracted with the William Cramp Ship and Engine Works of Philadelphia for two passenger and freight steamers. The vessels will be 325 feet long and cost about $400,000 each.

The Newport News Shipbuilding and Dry Dock Company on May 22nd launched the steamer "Mariana," intended for the Porto Rican freight service.

The Great Lakes Engineering Works of Detroit is building three 2000-ton steamers for the Clyde Steamship Company, from designs by Theodore E. Ferris.

On May 25th the torpedo boat destroyer "Cushing," built by the Fore River Shipbuilding Corporation, held a successful trial. The average for five top speed runs was 29.68 knots against a 29 knot requirement.

The new steel plant at Newcastle, New South Wales, began operations about two months ago by the "blowing in" of a 350-ton blast furnace. One blast furnace, three open hearth furnaces and a combination structural steel and rail mill have been completed and 60 by-product coke ovens are under construction. Australian Government orders have already assured the plant twelve months of operation at full blast, and it is expected that the company's facilities will shortly be doubled.

This plant is owned and operated by the Broken Hill Proprietary Company, which also controls large iron ore deposits in the State of South Australia. The ore is brought by steamer and landed alongside the dock adjacent to the furnaces. The coal supply is close at hand. Waste gas from the coke ovens will be utilized for reheating furnaces and under the boilers. The first steel was run off from a 60-ton open-hearth furnace on the 8th of April, while rails have been rolled up to 100 pounds per yard and "I" beams up to 15 inches in depth. The normal capacity of the plant running full will be between 50,000 and 60,000 tons per month.

Speaking of the need of more American shipping the Bache Review says: It might be asked why is not all the energy that is being and has been misexpended in trying to force through Government ship-ownership, used to correct the navigation laws, so as to make it possible and profitable to private capital to go into American shipping. The reason, of course, is that politicians and not business forces are managing this matter and the solemn consideration of lost labor votes puts politics into a panic. If the navigation laws are to remain as they are, the situation must be met either by the Government's making up the difference as an inducement to private capital, or by the Government's going into the business itself, as the President seems still to desire. But if the Government operates ships, as it must, at a loss in order to get the business, then private capital already in the business cannot compete and must retire, and no new capital will come in. So that, what merchant marine we have must mostly perish, and a great political shipping machine will take its place at the expense of the taxpayer.

The entrance of Italy into the European war was naturally followed by the confiscation of the fol-

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lowing German or Austrian ships that were in Italian harbors:

Name, nationality, seized at—	Built	Register Tons
"Albany" (Ger.), Syracuse		3,717
"Algier" (Ger.), Palermo	1909	3,127
"Amafi" (Ger.), Leghorn	1909	3,127
"Ambria" (Ger.), Syracuse	1908	5,143
"Ampelea" (Aust.), Syracuse		.....
"Barcelona" (Ger.), Syracuse	1909	5,465
"Bayern" (Ger.), Naples	1904	5,095
"Catania" (Ger.), Palermo	1910	2,996
"Fangturm" (Ger.), Palma		4,933
"Kattenturm" (Ger.), Syracuse		6,018
"Lispari" (Ger.), Catania	1912	.....
"Luzon" (Aust.), Leghorn		3,181
"Marsala" (Ger.), Naples	1910	2,276
"Mudros" (Ger.), Syracuse		2,017
"Rhenania" (Ger.), Naples	1909	3,935
"Sigmaringen" (Ger.), Syracuse	1910	5,710
"Spitzfels" (Ger.), Cagliara	1914	3,643
"Termini" (Ger.), Leghorn	1905	1,523
"Tunis" (Ger.), Palermo	1909	1,823
"Zivir" (Aust.), Syracuse		2,766
"Izabran" (Aust.), Venice		2,470
"Izgled" (Aust.), Venice		2,695
"Kossuth" (Aust.), Venice		2,335
"Luna" (Aust.), Venice		1,731
"Maria Racich" (Aust.), Venice		2,579
"Olga" (Aust.), Venice		1,952
"Quarnero" (Aust.), Venice		2,068
"Robinia" (Aust.), Venice		1,582
"Sancos" (Ger.), Venice		3,114
"Volos" (Ger.), Venice	1902	1,206
"Moltke" (Ger.), Palermo	1910	7,633
"Koenig Albert" (Ger.), Genoa	1905	6,590
"Pr. Regent Luitpold" (Ger.), Genoa	1910	3,768
Total tons registered		119,353
Total number of prize ships		33

An increasing share of the imports and exports of the United States is being carried in American vessels. The total value of our imports and domestic exports in the eight months from August 1, 1914, to March 31, 1915, according to the Department of Commerce, was $2,797,000,000, and of this sum $353,600,000 or 12.64 per cent. was carried in American bottoms. The corresponding period, one year earlier, showed a total of $2,960,200,000, of which $246,800,000 or 8.34 per cent. was carried in American vessels. The proportion of our domestic exports transported in American bottoms rose from 6.57 per cent. in the eight months ending with March, 1914, to 10.25 per cent. in a like period ending with March, 1915; while of the imports the proportion brought in American vessels increased from 10.73 per cent. to 16.60 per cent.

"Derrick" and other vessels engaged in laying the 36-inch submarine pipe line known as the Narrows Siphon, across New York Bay, from the foot of Seventy-ninth street, Brooklyn, New York, to Tompkinsville, New York, are again moored in the stream. Passing vessels are requested to slow down and give this plant as wide a berth as possible.

To meet the increasing needs of the port of Venice, a channel is being dredged at the Lido entrance to the harbor, which is to be deepened to 32 ft., and eventually to a still greater depth. New docks are also being planned at an estimated cost of $4,000,000 at Bottenighi, near the mainland, and a new channel, 23 ft. in depth, is now being dredged to connect them with the present maritime station. Mestre will then become an important town on the mainland. Moreover, with the confidence inspired by increasing importance, the establishment of a steamship line to China and Japan is being mooted, and a project for the joining up, by means of a canal, of the natural waterways between Milan and Venice is under discussion. The primary cost will probably amount to $10,000,000, and the expense of maintenance will be considerable, but it is hoped by this means to convert Venice into the most important transit center between Switzerland, South Germany, and Lombardy and the Near and Far East. The war, however, may alter these plans considerably.

That the boom in shipbuilding experienced in nearly every maritime country throughout the world is making itself felt in Japan is evidenced by the following consular report:

The demand for new ships having thus increased, the Mitsu Bishi Shipyard of Nagasaki, the Kawasaki Dockyard of Kobe, the Osaka Iron Works, the Uraga Dockyard Co. of Uraga, and several other shipbuilding plants are now having busy days. The Kawasaki Dockyard of Kobe have already undertaken seven new boats of no mean tonnage, while the Mitsu Bishi Shipyard of Nagasaki has contracted for six of between 3200 tons and 9400 tons, of which one is already building. The Osaka Iron Works has entered upon contracts for 10 bottoms with different tramp-ship owners. The Uraga Dockyard also is building three boats of between 3200 tons and 3500 tons for the Hokkaido Tanko Kisen Kaisha and others. The tonnage of these newly built boats will amount to more than 160,000 tons, which is a record-breaking figure and the highest ever reached in this country. The past record is 70,000 tons, launched last year.

S. W. Wakeman, for many years with the New York Shipbuilding Company, has accepted the office of General Superintendent of the Fore River Shipbuilding Corporation.

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Freight Report

By PAGE BROTHERS

San Francisco, June 17th, 1915.

Since our last circular, a month ago, freights have been very active (the activity limited only because of scarcity of tonnage) and have reached even higher limits than then quoted.

Balfour, Guthrie & Co. chartered ship "John Ena" for July loading at £11,250 lump sum from Portland with grain to Sydney. She sailed in ballast from Japan, and the owner expects her to come over in steamer time, so she should be July loading. Balfour, Guthrie & Co. also chartered ship "Francois D'Amboise" with wheat from Portland to Sydney or Melbourne at 65/-. M. H. Houser chartered bark "Amulree" from Portland to U. K. at 70/- with the option of Cape Town at 60/. Kerr, Gifford & Co. chartered steamer "Derwent River" from Portland to U. K., rate reported at 87/6. They have also chartered the steamer "Egyptian Transport," now discharging coal at San Diego for the Government, to load at Portland for Australia; the rate has not been given. W. R. Grace & Co. have sold two cargoes to Australia composed of wheat and hay from San Francisco and/or Portland, also on private terms. M. H. Houser will have the distinction of loading a small steamer in the shape of the "Colon" and at the highest rate of freight, so far, from Portland to Sydney or Melbourne, but we cannot yet divulge the rate of freight.

By far, the greatest chartering has been from the North Pacific for new crop loading, ranging from September to December, and even January, for grain to U. K. "Cornil Bart" and "Berangire" were chartered by Balfour, Guthrie & Co. at 72/6, followed by M. H. Houser paying 75/- for "Inverlyon" and "Bell" and 77/6 for the "Jules Gommes." The above are all sailers. On the 1st of June, Balfour, Guthrie & Co. were reported by cable to have chartered two steamers for October/November at 82/6 in the same direction, but their names have not been announced, and in the early days of June, M. H. Houser took the ship "Galgate" at 78/9, followed a few days afterwards by the "Lindfield" at 85/-, Hind, Rolph & Co. paying the same rate for the "Langdale," and Strauss & Co. chartered ship "Yawry" at 82/6 to load either at San Francisco or Portland, vessel getting orders off Golden Gate. Balfour, Guthrie & Co. took "Dupleix" and "Hiawatha" both at 85/-, November/December, followed by Mr. Houser taking "Souverain" and "Wiscombe Park" at 85/-, November 15th, with deductions of 1/3 per ton for November 30th and December 31st, respectively. About the 9th of June, Strauss & Co. chartered "Olivebank," "Gezina" and "Nordsee" all at 85/-, and "Dolbadern Castle," also by Mr. Houser, at 85/-, and one vessel, ex-German ship "Heintz," was chartered by parties yet unknown at 82/6 for December loading, 80/- January, and 77/6 February, which is a high rate to speculate on for such a distance. The only steamer chartered lately for U. K., new crop loading, was the "Caldergrove" from Portland at 90/- by M. H. Houser, the highest rate yet.

Our San Francisco shippers do not seem to be imbued with the speculative feeling as displayed by Northern charterers, the only vessel reported here for new crop loading being the "Champigny" taken by Balfour, Guthrie & Co. at 75/-.

Lumber freights have also shown a decided and steady advance, since we last wrote our report. Balfour, Guthrie & Co. chartered schooner "Corona" from Puget Sound to Talara Bay at 72/6, and Comyn, Mackall & Co. chartered "Arago" from the North Pacific to Chile or Peru, said to be at the same rate. For Australia, since the 17th of May to date, twenty-five sailing vessels have been taken by our different shippers at rates varying from 70/- Sydney and 80/- Melbourne, by advances of 2/6 per thousand, up to 82/6 Sydney and 92/6 to Melbourne, and some vessels have been chartered as far as May/June 1916, at a reduction in rates of about 5/- from that paid for the same vessels for this year's loading.

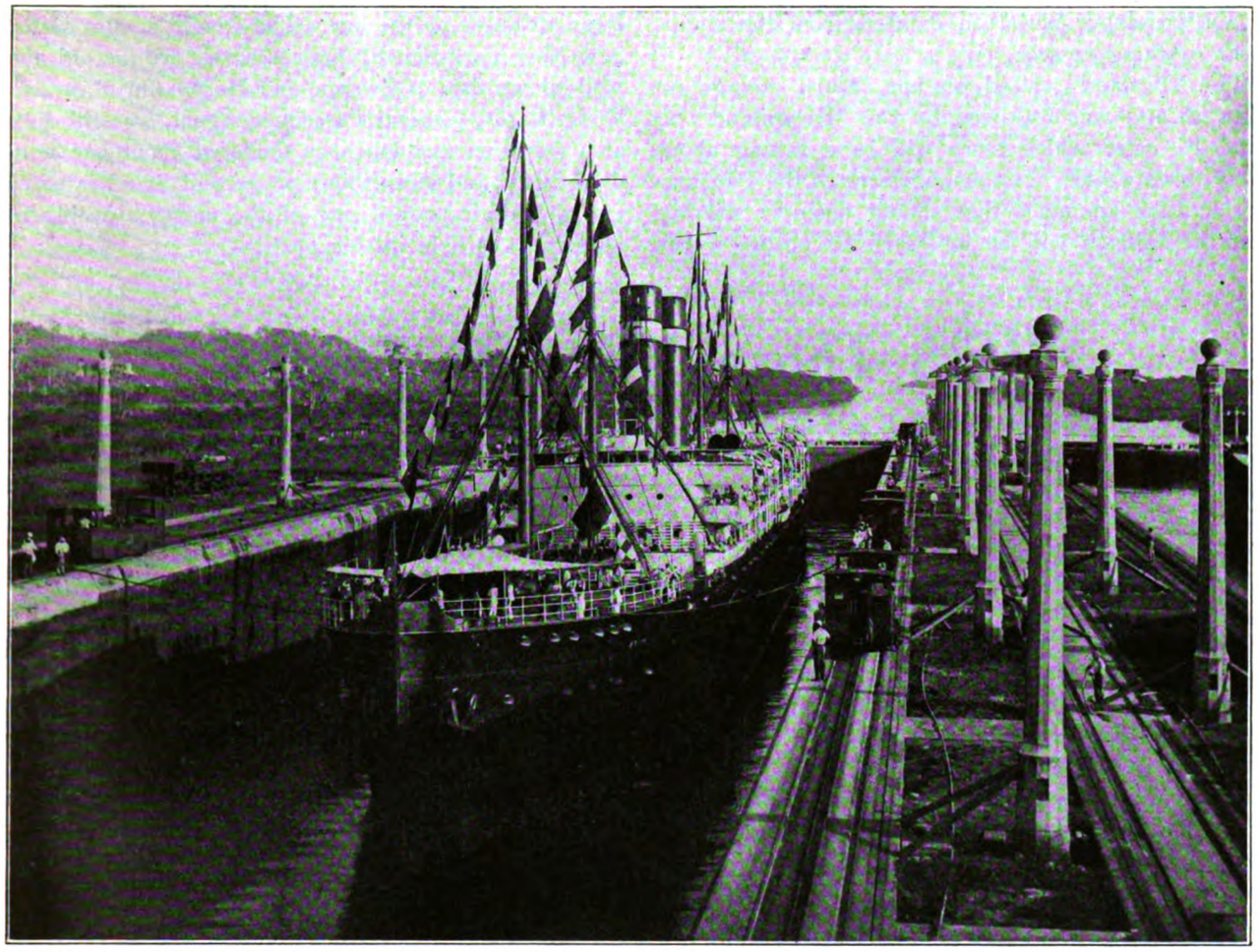
For the Orient, Waterhouse has been the principal charterer, having taken Japanese steamer "Gishun Maru" on the round, delivery and redelivery Japan via Vladivostok at 10/3 on the deadweight, and the "Hudson Maru" at 10/-, and latterly, the "Saikai Maru" at 11/- on the deadweight, same sort of charter. Comyn, Mackall & Co. have taken steamer "Tokai Maru" for delivery and redelivery Japan with Pacific Ocean trading, also option of the East Coast of North and South America, at 11/6.

For Africa, we have only to report the schooner "W. H. Garms" from Columbia River or Puget Sound to a direct port at 120/- per thousand. No steamers or sailers have been chartered for U. K. since our last report, as they are impossible to get excepting at remarkably high rates.

The steamer "Queen Maud" has been fixed at 14/6 on the dead-weight, delivery and redelivery Australia for Pacific Ocean trading, and it is reported that she will load grain from this port or from the North for Australia, probably for account of Davies & Fehon of Sydney.

There is no possible chance for freights to be lower as long as this war keeps up, and even if it were to stop, though there would be a drop, freights would still rule high, in our opinion.

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The Panama-Pacific Line's steamer "Kroonland" passing through the locks in the Panama Canal.

The Panama-Pacific Line

The most important event of May in San Francisco was the advent of the Panama-Pacific line with the arrival of the steamer "Finland" from New York. The "Finland" is a steamer of 12,185 tons gross register, 560 feet long between perpendiculars, 60′-2″ beam and 38′-4″ molded depth. She is driven by two sets of triple expansion engines with cylinders 32½″, 54″ and 89½″ by 54″ stroke, to which steam is supplied by nine Scotch boilers with 170 pounds effective working pressure, 36 furnaces, 643 square feet grate surface and 22,408 square feet of heating surface. The ship and engines were built by the William Cramp Ship and Engine Building Works of Philadelphia in 1902.

A visitor to the "Finland" is immediately struck by a sense of comfort on board and also the realization that he is on a ship. The first-class staterooms are especially attractive with their mahogany berth boards, rail, furniture and trim. Electric fans are a part of the equipment of every room, folding wash basins in handsome mahogany cases and substantial nickel hardware all add to the sense of solidity, simplicity and richness. The first-class accommodations are all located amidships with the first-class lounge forward under the bridge on the bridge deck. This room is finished in white enamel with parquet floor. Aft of the funnels on the same deck as the lounge is located a ladies' parlor in mahogany and creton paneling with a card-room adjacent in bird's-eye maple. Still further aft is a smoking-room in mahogany with heavy leather upholstery. The dining-room is on the upper deck and extends the full width of the ship. This room is in white enamel with heavy beamed ceilings. The web frames have been utilized as the motive for partial bulkheads which divide the sides of the room into attractive alcoves. The lighting is secured by means of cluster lights along the bulkheads and ceiling globes between the beams, the result being a most soft and attractive illumination.

The main promenade of the "Finland" is located on the bridge deck with the boat deck extending overhead providing a large shaded space for the use of passengers in warm weather. The kitchen and pantry service on the "Finland" and her sister ship, the "Kroonland," has been carefully worked out with reference to efficiency and smoothness and nothing that might prove conducive to the comfort and safety

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of the passenger has been omitted from the equipment of these vessels.

The "Finland" sailed on her return voyage on May 26 and was followed by the "Kroonland" on June 16, after which there will be a sailing about every three weeks. The management of the Panama-Pacific Line announce that should business warrant that the sailings will be increased by putting other large steamers on the line. The freight agents of the new New York-San Francisco service are the old and well-known firm of Swayne and Hoyt. On May 20th T. H. Larke, General Passenger Agent, was the host at a reception and luncheon tendered about one hundred traffic and steamship men around San Francisco and the affair proved one of the most enjoyable of its kind ever held in this port.

With Those Who Do Things

DEVELOPMENT OF THE AUXILIARY SAILING SHIPS.

New York harbor has at present a visit from an interesting sailing craft, the Norwegian auxiliary sailing ship "Elfleda" arriving on the 7th of June and moored at Stapleton, Staten Island.

The "Elfleda," which is 226 feet in length with a beam of 36 feet and depth of about 21 feet 9 inches, has a gross tonnage of 1240 tons and dead weight carrying capacity of 1900 tons. This ship was built at Londonderry, Ireland.

From a marine point of view the "Elfleda" is unusually interesting, being equipped with twin screws driven by 120 Bolinder's oil engines, and at an interview with the manager, Mr. Christoffer Hannevig, it was stated that the ship made an average speed across the Atlantic of 9 knots, the total fuel consumption on the entire trip being 12 tons. The guaranteed maximum fuel consumption of this engine is 58 lbs. per brake horsepower per hour.

The "Elfleda" is owned by the Trans-Atlantic Motor Ship Co., Ltd., of Christiania, Norway, the directors of which consist of the following gentlemen: Messrs. Chr. Hannevig, E. Rasch, and P. Stvri, Mr. Hannevig being manager of the company. The latter gentleman is at present staying in New York to solicit freight business and has given interesting points as to the adoption of serving oil engines for this kind of freight traffic. The above company was formed to use exclusively Bolinder engines for sailing ships in trans-Atlantic service. The "Fingal," which is a much larger vessel than the "Elfleda," dimensions being 308 feet in length, beam 42 feet, depth 24 feet, with a dead weight carrying capacity of 3900 tons, is equipped with two 160-horsepower Bolinder engines. Further the "Lota" of the following dimensions: Length 232 feet, beam 37 feet, depth 21 feet 6 inches, dead weight cargo carrying capacity 2100 tons, also equipped with two 120 Bolinder engines, is approximately 10 per cent. larger than the "Elfleda." Mr. Hannevig states that his company has recently concluded the purchase of five sailing vessels, their names being the "Trans-Atlantic," "Kwango," "Lapwing," "Catharina," and "Transii," all of which will be equipped with Bolinder engines.

Of the above mentioned ships, the "Fingal" sailed from Norway on the 7th inst., the "Lota" being due to sail on the 19th inst., both for New York.

This is the first instance so far as we are aware of a company being formed for carrying on trade by auxiliaries exclusively and it will no doubt give an impetus to the construction of this type of craft.

It appears that previous experience has shown those interested in this development, that with a particular type of craft the auxiliary offers greater advantages than the full power craft. It is enabled to reduce the cost of operation to a minimum and also to accelerate the time so that a higher speed can be made with the auxiliaries than with the ordinary full-powered sailing craft.

The company above referred to was inaugurated on the 10th of February, 1915, with a capital of 1,382,000 kroners ($368,550), the directors having the power to increase same up to 2,000,000 kroners.

BOAT HANDLING.

The handling of boats at sea is attended by the greatest difficulty and danger and is usually called for at a time of great confusion and can only be faultlessly accomplished through the coolness and trainnig of those doing the work. The less the boatmen have to do to successfully get the boat away from the ship's side when lowered into the water the better. Therefore, appliances for detaching boats should be reliably automatic and should only release when the boat is water borne, and should not require the pulling of a lanyard or the undoing of a latch by some one at the critical moment. A device requiring some one to do a particular thing at a particular time is not so reliable as a device that works automatically as lifeboats are usually crowded and the releasing may be accomplished either too soon or too late to make a safe launching.

Another essential factor to be taken into con-

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sideration is the hooking on of the boat, as lifeboats are often used for other purposes than abandoning ship. A simple and reliable attachment that is easy to hook on as well as reliably automatic in releasing is needed.

In the loss of the "Titanic," as described by Mr. Lawrence Beasly, a vivid picture is given of lowering and freeing boat No. 13 in which he left the ship's side. The boat was lowered with 60 or 70 people on board, and, after reaching the water with boat No. 14 coming down so close to the occupants of boat No. 13 that they could reach up and touch the bottom of the upper boat, Mr. Beasly says:

"One of the stokers shouted, 'Someone find the pin which releases the boat from the ropes.' No one knew where it was. We felt around as well as we could. The next drop would have brought the boat above on our heads, but another stoker sprang to the ropes with his knife, cut them and No. 13 drifted clear." Had this boat been fitted with an automatic releasing device she would have gone clear of the tackles when she reached the water.

In the case of the oil steamer "Oklahoma," one of the rescuing steamers failed to get two boats away for the reason, in one case, some one neglected to "throw back the tiny lever," spilling the men into the water, and in the other, one man had his fingers cut off in attempting to operate the detaching gear. There are times of course when it would be impossible to launch small boats with any kind of device, automatic or otherwise, but the necessity of having some one release a boat at the critical moment complicates an operation whose greatest chance for success lies in its simplicity.

A device which well fulfills these conditions is the Raymond Releasing Hook. This device is reliably automatic, the hooks detaching when the boat is water borne and being free of danger of releasing by any jar. By use of lanyards rove in the bills of the hooks, a boat may be hooked on easily at night. The Raymond hooks are in use in the United States Navy and revenue cutter service as well as over a large part of the passenger carrying vessels coming under the supervision of the steamboat inspection service. Its simplicity of construction, reliable automatic action, the ease and certainty with which it can be hooked on in the roughest sea or on the darkest night, commend it to all practical seamen as the best device for the purpose intended.

The Petroleum Transport Company has contracted with the New York Shipbuilding Company for a 12,000-ton tanker.

REPORT ON A WIRELESS DIRECTION FINDER OF MARCONI-BELLINI-TOSSI SYSTEM.

The Norske Amerika Line's steamer S. S. "Kristianiafjord" left Christiania on March 21 at 9 a. m. During the passage out of the Fjord wireless communication was steadily maintained with Ovresaeters Wireless Land Station (½ KW Telefunken temporary military installation near Christiania).

At Filtvedt bearing was taken of the Navy Yard Station at Horten by the Direction Finder till we had the station a-beam and the bearing was checked with the one taken from the bridge, and found correct. The communication with Ovresaeter was lost 50 miles off when we passed Fuglehuk.

We were keeping steady bearing with the Tjomo Radio while we were going out of the Fjord past the Faerder Lighthouse, and the results were good. At 5:30 p. m. bearing was taken of the Flekkero Radio at a distance of 34 miles. The bearing corresponded exactly with the ship's position. At the same time bearing was taken of the Naval Station at Horten, the distance being about 90 miles off. The discrepancy of this bearing appeared to be 1½° and two miles off the actual ship's position.

At 6:20 p. m. bearing was taken with the Flekkero Radio at 20 miles distance. The discrepancy of the angle was about ½°. At 7 p. m. we again took bearing with the Tjomo Radio 90 miles off, the discrepancy of the angle being 1°, and referring to the ship's position, 1.6 miles.

At the inlet to Christianssand, at 8 p. m., bearing was taken with the Flekkero Radio, and this corresponded very well, and the same good results were observed when we passed out from Christianssand again at 9:45 p. m. During the voyage westwards we found by the Wireless Direction Finder the correct position of different Norwegian warships scattered along the coast.

At 12 p. m. we took bearing with a Norwegian torpedo-boat destroyer, which we called up in the Wireless, and checked the position which was found to be 1° off the bearing taken by the Wireless Direction Finder, the distance being 15 miles. At 1 a. m. bearing was taken with a Norwegian cruiser, and from communication we had with her the distance proved to be 38 miles, and the discrepancy of our bearing was 2°.

At 2:45 a. m. bearing was taken of the same warship, the fault being 3° and the distance 12 miles off. At 5:30 a. m. bearing was taken again of the same warship 17 miles off, the fault being 1½°.

At 6:30 a. m. bearing was taken of a Norwegian gunboat which was lying in Haugesund. The distance was 31 miles and the discrepancy 1°. At

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FIREMAN'S FUND
INSURES HULLS, CARGOES,
HEAD OFFICE: CALIFORNIA AND SANSOME

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LONDON

G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Stavanger at 10:45 a. m. we took bearing of the same ship 30.5 miles off, the fault being 2°.

At 4 p. m. bearing was taken of the same ship repeatedly, the faults being on an average of 1°.

During the voyage from Stavanger to Bergen in the evening of the 22d instant, bearings were taken of a Norwegian cruiser and a torpedo-boat destroyer stationed in these waters. These bearings showed a constant fault in a southerly direction of 6/8°, and it is believed that this fault was due to local conditions in this district. During the trials later on, taken with the Bergen Radio and a Norwegian warship lying at anchor in the port of Bergen, the results were varying between 1 and 40 from the actual ship's position. The distance to Bergen Radio and to the warship ranged between 62 and 50 miles.

While lying in the port of Bergen tests were made with the same warship, which was lying only 600 meters from the "Kristianiafjord," and the results were exact. This should prove that it is possible by the Direction Finder to take the position exactly of other steamers, for instance, in foggy and thick weather, even at short distances.

During the afternoon of the 21st instant bearings were taken with the Gothenburg Radio (Sweden) repeatedly and faults of from 8° to 10° were always found. Discrepancies were always found in the northern direction. As no such deviation is found during the tests with other wireless stations, this must apparently be due to a fault, and it will be examined by the Telegraph Department, whether the wireless communication from Gothenburg in this direction shows variations. The signals from Gothenburg were very good even at a distance of 130 miles, and even in the evening of the 22d Gothenburg was heard at a distance of 240 miles.

Conclusion.

The impressions of the instrument, although it has been tested only for a short voyage, are that we here have an excellent help for safe navigation, although it must be reckoned with about 3° discrepancy in the bearings if the distances are not too long. The manipulation of the apparatus is very easy and by a little experience bearings can be taken very quickly.

The distance obtained from 90 to 130 miles, proves also that the apparatus is rather sensitive.

The following gentlemen were present during the tests on the voyage:

Captain Gootwaldt of the Royal Norwegian Navy.

Mr. Hermond Petersen, engineer of the Telegraph Department.

Mr. Skolem, engineer of the Army.

Mr. Trost, Marconi engineer at Stavanger Radio.

Mr. Christensen, inspector of the S. A. I. T., besides both the telegraphists of the steamer and the captain.

Yours truly,

(Signed) Captain L. C. Hjortdahl.

FEED WATER METERS.

The measurement of water has become a subject of great interest to a large number of people. The feed water meter is a sort of cash-register for the coal pile, since it keeps a record of the returns in amount of water evaporated for the expenditure for fuel. When the evaporation is low, the owner or operator will naturally look for the cause, as in inferior or unsuitable fuel, defective grates, leaky boiler settings, broken down baffles, soot and scale on the tubes, improper methods of firing, insufficient or improperly handled draft, etc., and as these conditions are improved one by one, the feed water meter records the simultaneous improvement in evaporation, establishing a standard which acts as a constant stimulus and incentive to effort on the part of the boiler-room force. In other words, although the owner or managing engineer cannot watch everybody and everything, the feed water meter can do it for him, so far as the performance of the boiler is concerned. These facts lend special interest to a leaflet on "Testing V-Notch Meters," issued by the Harrison Safety Boiler Works, Seventeenth below Allegheny avenue, Philadelphia, Pa. This publication (Engineering Leaflet No. 18) is a reprint of two im-

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portant papers on the V-notch weir as used in the Cochrane Metering Heater. The earlier paper, by James Barr, describes at considerable length and detail the apparatus used by him and the results obtained in tests conducted at Glasgow University in 1907-09, by which he established the fact that with a V-notch weir the true discharge for given conditions could be determined within 1/3 of 1%. The later paper by W. S. Giele, describes a commercial testing apparatus of large capacity installed by the Harrison Safety Boiler Works for the purpose of carrying out an extensive series of tests upon V-notch weirs of different dimensions as actually installed in commercial meter chambers manufactured by them.

Both papers are interesting as illustrating on the one hand the many refinements which are essential in the precise investigation of problems in hydraulics, and on the other the admirable constancy of the V-notch weir when used under known and predetermined conditions.

FLEETS OF THE WORLD 1915.

Compiled from official sources and classified according to types. 103 full page illustrations. 198 pages. Oblong 8vo. Cloth $2.50.

You want to look up the points of a battleship, cruiser, destroyer or submarine that has appeared in the day's news, or to make sure of some naval term, or to compare gun strengths of the different navies,—this book will satisfy the above and many other desires. It is indeed a volume of the greatest value to all who are interested in the naval aspect of the war.

The 103 full page phtotographic illustrations of battleships, cruisers and submarines, the complete list (of all ships) together with the date of completion, and the tonnage displacement, of all ships in all the navies of the world from Great Britain's to Siam's, makes the work one of thoroughness and value unrivaled by any other publication.

The cost of the book is small considering the great care with which it has been gotten up. The collection of illustrations is itself of paramount value and they are most revealing in giving up an insight into the shades of differences in ships of different countries. The modernity of the work is attested by the fact that an interesting table of all the naval losses that have been sustained since the war commenced is given. There is note made of the internment of the "Kronprinz Wilhelm" and in the regular tables are listed the ships that are on the ways being prepared for the terrific struggles of the summer. The wide awake newspaper reader should obtain this book. Every reference library that pretends to provide the best information upon present day happenings should certainly have it on the war shelves.

A STEAMSHIP EXHIBIT.

One of the most attractive and interesting exhibits in the Transportation Building at the Panama-Pacific Exposition is the exhibit sent in by the Holland-America Line and covers an area of 90x30 feet. It consists of an exact replica of a first cabin suite; regular first cabin, second cabin and third-class staterooms; third class dining-room and pantry, as will be found on the new Holland America Line triple screw turbine steamer "Statendam" of 35,000 tons register and 45,000 tons displacement, now in course of construction at the shipyards of Harland & Wolff, Belfast. The first cabin suite is built in Empire style, dark mahogany; bedroom in white enamel and gold panels in silk, carpets to match. Private bathroom adjoining. Thirty-two of similar suites are to be found on S.S. "Statendam." They are lighted by electric ceiling lights and wall brackets with portable lamps on writing tables.

The second cabin rooms are built in dark mahogany and light colored wood. They consist of 2-berth and 4-berth rooms, several being tandem rooms.

The third class rooms consist of 2-berth, 4-berth and 6-berth rooms, thus insuring entire privacy for families. The dining-room and third class pantry will be a revelation for many, who at present have an in-

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adequate idea what the modern trans-Atlantic liners offer to the traveling public.

The Holland America Line is one of the prominent trans-Atlantic steamship lines which, even during the present European war, has maintained a regular weekly passenger service between New York and Rotterdam. On the eastbound voyages the steamers touch at an English port for the landing of passengers who have England for their destination. Westbound as well as eastbound these boats touch at Bologne Sur-Mer for the landing and embarkation of passengers to or from France and Southern Europe.

A BROBDINGNAGIAN LIGNUM VITAE LOG.

The steamer "San Juan" arrived the other day from Central America bringing from the Port of Corinto, Nicaragua, a shipment of Lignum Vitae logs consigned to White Brothers, the pioneer hardwood lumber dealers of San Francisco.

This particular shipment contains logs of very large diameter and among it is one log which is probably the largest Lignum Vitae log which has ever come into this market. In size it is 36" in diameter, 9' long, and weighs 4260 lbs., or over two tons. This log has been inspected by a great many lumber experts and they all agree that it is the largest log that they ever saw and the grandfather of all Lignum Vitae that ever came into this market.

For a number of years large sized Lignum Vitae logs have been rather scarce in the Pacific Coast market, but a new tract in Central America has been tapped and large diameters are now coming forward, and White Brothers have quite a stock of this extra-sized wood.

The Bolinder engined "Gallia" has now been running about fifteen months and her owners report on her performance as follows: "For the usual little repairs we have never had to take the ship out of service, from which it would appear that the motor installation in general does not leave any opening for doubts of its reliability, thorough construction or material and workmanship. The crude oil consumption at about eight knots speed, with ship fully loaded down, is about 100 K.G. per hour—.55 pounds or less per brake horse-power hour. This consumption was figured on long trips. The engines maneuver very quickly and easily and do not race in rough weather." The "Gallia," mentioned above, is a handy freighter 190 feet long, 33'-8" beam and 18'-0" deep with a deadweight capacity of 1630 tons. She is powered with two 320 B.H.P. 4-cylinder Bolinder direct reversible engines, one 10-horse-power Bolinder for the windlass and one 10 horse-power Bolinder for the air compressor and steering gear. The Bolinders Company has just secured an order for twin sets, each consisting of two 320 horse-power sets of the latest design for the ships "Drente" and "Limburg."

ANY OLD BOAT (STEEL OR WOOD) MADE AS GOOD AS NEW.

If the frame is fairly strong the condition of the planking doesn't matter; just cover with canvas attached with Jeffery's No. 7 Black Soft Quality Marine Glue. Note below the result obtained by one of our customers as stated in his letter recently received:

"Some time ago I covered a wooden clinker-boat with canvas laid in your glue and it has given perfect satisfaction, having held the canvas so closely to the wood that you would never think it was covered with canvas unless you were very close to it.

"This boat was a clinker cedar boat twenty-five years old and there didn't seem to be a possible chance to stop it leaking, but it was such a light rowing boat and one of the best shapes on the river that I hated to let it go. This boat belonged to another person and he allowed me the exclusive use of it if I would fix it up. Result—some of your glue and enough canvas to cover it, ironed on with a hot flat iron, and it hasn't leaked a drop since."

No experience required—just send for booklet, "Marine Glue, What to Use and How to Use It."

LAUNCH OF THE "WAINWRIGHT."

On June 12, the New York Shipbuilding Company launched the U. S. torpedo-boat destroyer "Wainwright." This vessel is 315' 3" over all, 310' 0" between perpendiculars, molded beam 29' 10"; extreme beam 30' 6½"; molded depth 17' 7½"; trial displacement 1,150 tons; mean draft 9' 8½"; required speed on trial 29.5 knots; fuel oil capacity 290 tons, and shaft horse-power 17,000.

The "Wainwright" is the largest of this type of torpedo-boat destroyer in the U. S. Navy and is armed with four 4"-50-caliber rapid-fire guns and four 21" torpedo tubes; deck-mounting. She is propelled by twin screws driven by Parsons turbines, with geared turbines for cruising speeds. Steam is supplied by four Thornycroft Express type water tube boilers. Accommodations are provided for five commissioned officers, eight petty officers and eighty-seven men.

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We are in receipt of Coil No. 1, First Fathom of the Salesman-Ship of the Columbian Crew, an attractive and interesting little "trade" magazine issued by the Columbian Rope Company.

The voyage of the "Steel City" from Chicago to New Orleans by the all-water route marks the opening of a freight and passenger service which will probably mean a great deal to the entire Mississippi valley.

Articles of incorporation have been filed in Delaware by the Standard Transportation Company of New York. The capital of the organization is $15,000,000 and its purpose to build, purchase and navigate ships.

The Federal Composition and Paint Company have just issued a handsome leaflet of testimonials illustrated with pictures of some of the vessels, mostly Pacific Coast craft, that are using their compositions and paints.

On June 12th, the New York Shipbuilding Company launched the torpedo boat destroyer "Wainwright." The "Wainwright" is one of the large 29½ knot destroyers authorized some time ago. She is 315 feet in length.

With the return of the "Great Northern" to the Portland run, the Great Northern Pacific Steamship Company will resume their original tri-weekly schedule, boats leaving Flavel and San Francisco on Tuesdays, Thursdays and Saturdays.

The first advance general program of the International Engineering Congress and four Engineering Society Conventions occurring from Sept. 16 to Sept. 25, inclusive, is now published. Aside from the meetings themselves, seven attractive excursions have already been arranged for.

The most important real-estate deal of the year in the Hawaiian Islands was the recent purchase by the Inter-Island Steamship Company of the 35-acre Dowsett estate property which fronts on the proposed Kalihi channel. Shops, warehouses and docks will be put on this property, which cost $340,000.

William W. Keith has been appointed Manager of Oakland Harbor at a salary of $4,000 per year. In this connection it is worthy of note that Oakland is now seriously bidding for the attention of steamship companies engaged on the deep sea routes, and the present callings of the "Admiral" Line boats will soon be supplemented by many others.

The Terry Steam Turbine Company has appointed Mr. Merton A. Pocock district sales manager for Minnesota, North Dakota and South Dakota with headquarters at 400 Endicott Building, St. Paul. The Hawkins-Hamilton Company, People's National Bank Building, Lynchburg, Virginia, has been appointed the Terry agent for the State of Virginia.

Bulletin No. 42552, entitled Motor-Generator Sets, has just been issued by the General Electric Company, and is an attractive publication of twenty-eight pages, inclosed in a designed cover and containing numerous illustrations of various types of motor-generator sets designed and manufactured by that company. There is included a general description of this type of apparatus.

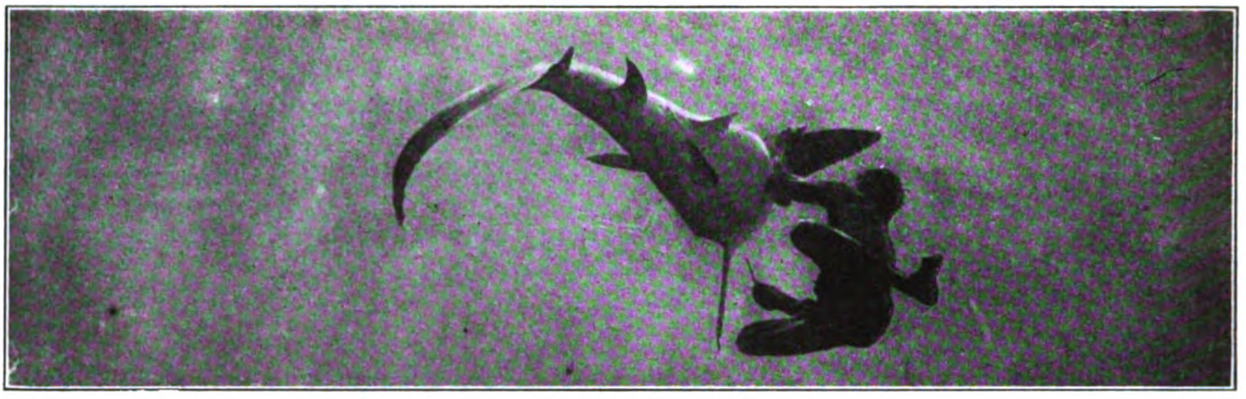
The Nordberg Manufacturing Company of Milwaukee announce that Mr. E. W. Swartwouth, formerly of their Chicago office, will be associated after June 1st with Mr. MacLaren in the New York offices of the company, where enlarged quarters have recently been secured in the Equitable Building, 120 Broadway. The Chicago office will be placed in charge of Mr. John E. Lord.

The sale of the canneries of Gorman & Company to the Booth Fisheries Company for a consideration said to be in the neighborhood of $800,000, is one of the largest cannery deals ever put through in the Northwest. The properties sold include canneries at Shaken and Kassaan, Southeastern Alaska, and at Neah Bay, Port Angeles and Anacortes in Washington. The Alaska canneries referred to had an output last year of 115,000 cases of salmon.

The Inland Navigation Company, New York, has been incorporated in the State of Delaware with a capital of $9,000,000 to engage in the transportation of mail, passengers and goods of all kinds on land or sea by canals, rivers, lighters or any other craft in the United States. The incorporators are A. Rust Oppenheim, J. H. Bernhard, the well-known Inland Transportation engineer; S. B. Israel, and Paul Doring, all of New York, and G. H. Tenbroek of St. Louis.

The William Cramp & Sons Ship and Engine Building Plant has secured orders for three new merchant vessels, as follows: Two vessels for the Atlantic and Pacific service of W. R. Grace & Company, being similar vessels to the four "Santas" of that line, and one large oil tanker of 10,000 tons capacity for the Huestica Oil Company of New York.

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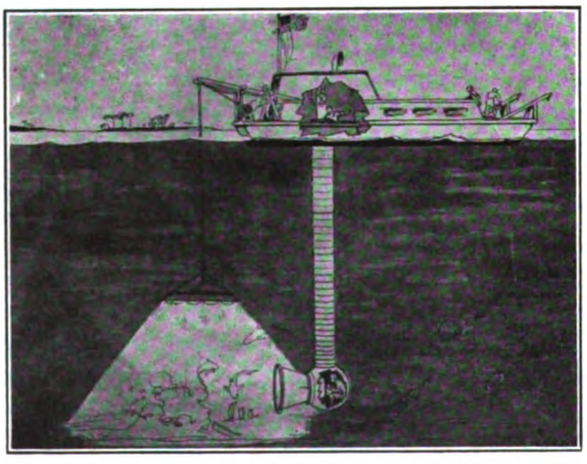
A man in the act of knifing a shark.

Submarine Photography

IN these days of daring exploits of arms, when the engines of destruction that operate under water are the cause of so much comment, it is particularly pleasing to turn to an equally remarkable but far more humane development of science. One that seems destined to play an important part in naval affairs is that of submarine photography, or the taking under water of pictures, both stationary and moving.

The actual taking of the photographs is not so difficult, the main requisite being to get beneath the water, to remain there in comfort, and be able to perform the work.

This work is made possible by an invention of Charles Williamson and his two sons of Norfolk, Virginia, which consists of a collapsible accordion-



The collapsible tube used in connection with a diving bell.

like submarine tube of waterproof canvas and rubber, three feet in diameter, braced at regular intervals by iron rings. This construction permits the passage of a person down the tube, and its flexibility permits it to be dragged along by a vessel. The top of the tube remains open at the deck, and the lower end extends down into the water and expands into a chamber about 5 feet in diameter, one side of which is provided with an observation glass window through which the pictures are taken. The space in the chamber is sufficient to permit two men, one to operate the camera, and one to control the movement of the tube which is effected by chains operated from the deck of the boat. Fresh air is provided by a simple device, enabling the operators to work in comfort.

In order to accomplish submarine photography, however, it was necessary to secure some efficient means of artificial illumination which could be easily handled, would furnish the desired light, and not be prohibitive in cost. After trying other types with varying success, the Cooper Hewitt Quartz Lamp, as illustrated in figure 2, was adopted. A battery of nine of these lamps, each having 2400 candlepower, was installed. This lamp consists of a short tube of pure fused quartz or silica containing vapor of mer-



Diver examining parts of an old wreck.

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cury, which is made luminous by the passage through it of an electric current.

The essential parts of the lamp are the quartz burner and the auxiliary. The former is the light-giving tube, its support an enameled reflector, while the latter consists of the necessary tilting mechanism and coils for starting and maintaining the mercury arc.

In ordinary commercial use, the burner is suspended from the lower part of the auxiliary and enclosed in a glass globe, but for submarine work the auxiliary is kept on board the boat, and the burner with its reflector holder is mounted in a casing that is placed in a frame and lowered into the water. The construction of the lamp and its method of installation are shown in figures 1 and 2.

Although scientists abroad have been experimenting with under-sea photography for many years past, an Englishman, Dr. Ward, having photographed objects in a fish pond at a maximum distance of three feet through the water, it remained for American inventors, the Williamsons, and an American product, the Cooper Hewitt lamp, to successfully solve the problem in a practical manner. Photographs and moving pictures have been made through the water by the method described for a distance of 100 feet, thus making an epoch in photography, and surprising even the most ardent advocates of the scheme.

The illustration shown in figure 3 is one of the

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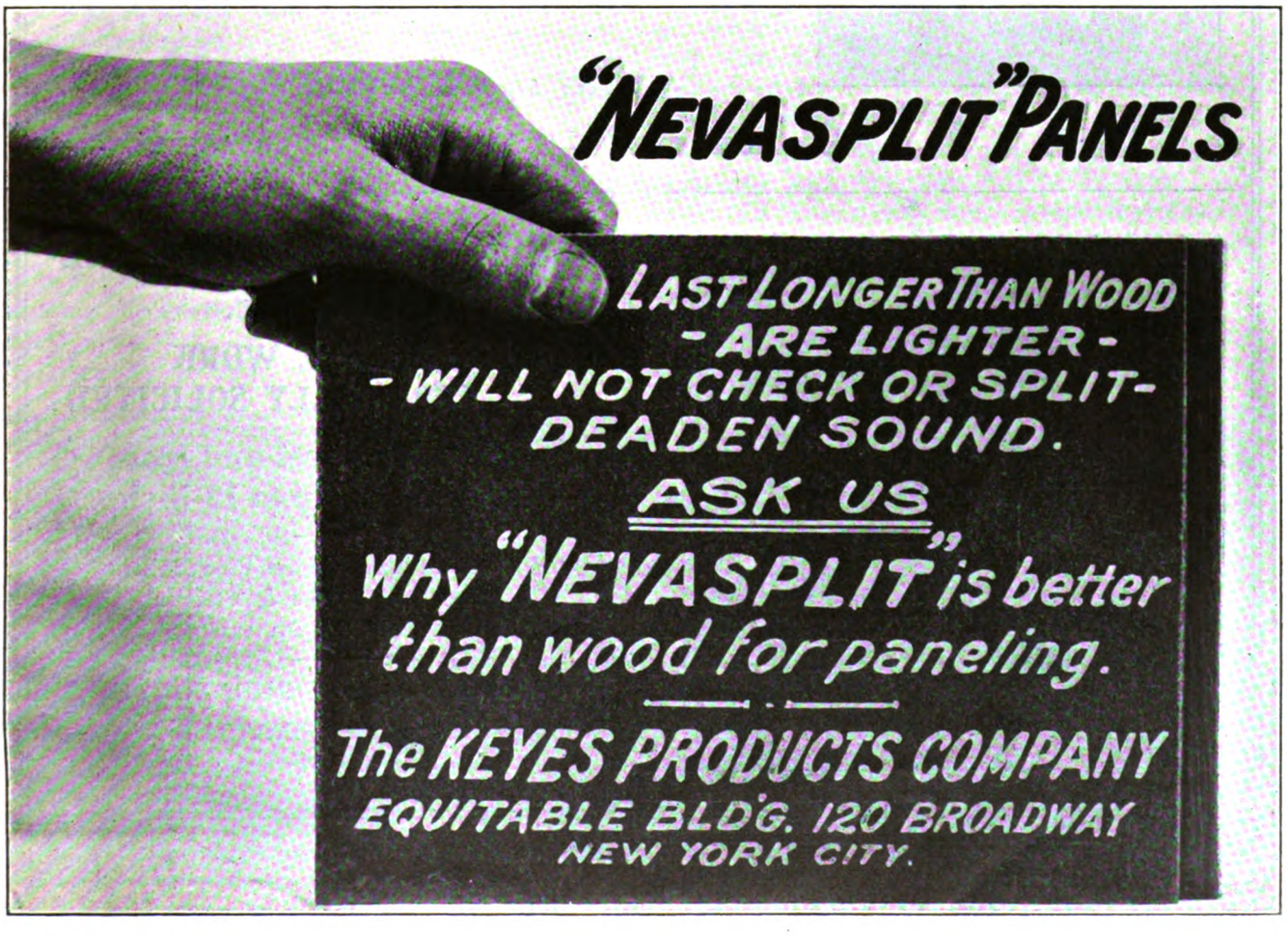
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SCOTT PATENT WATER TUBE BOILER



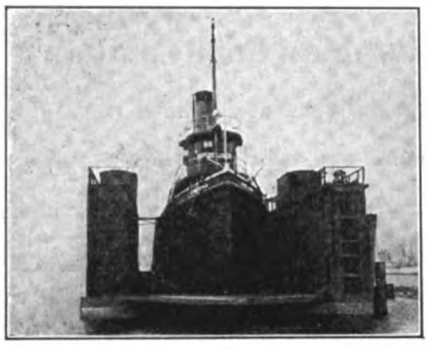
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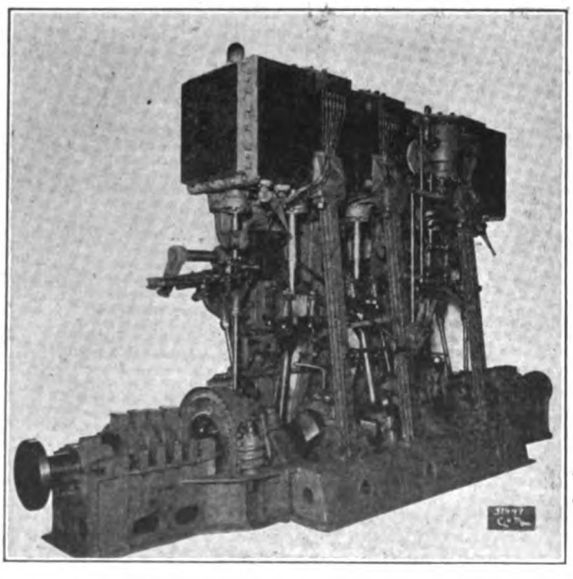
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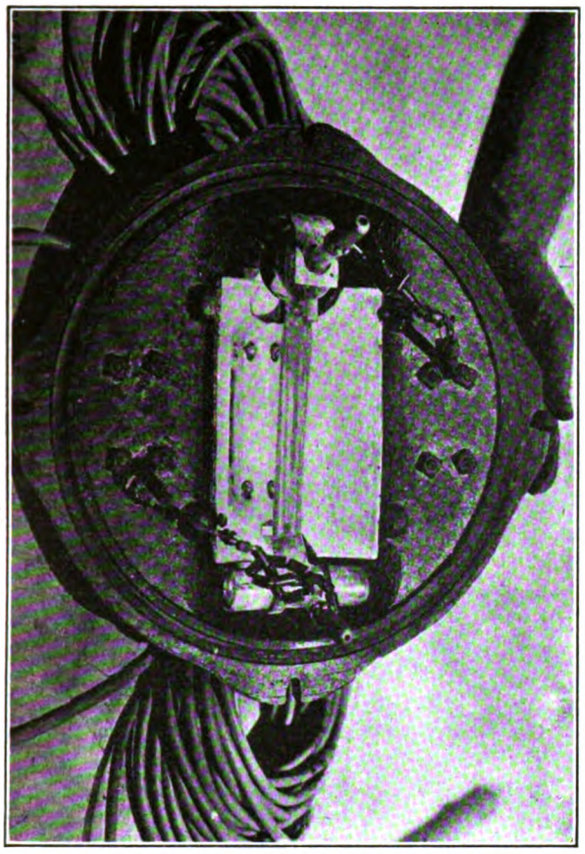
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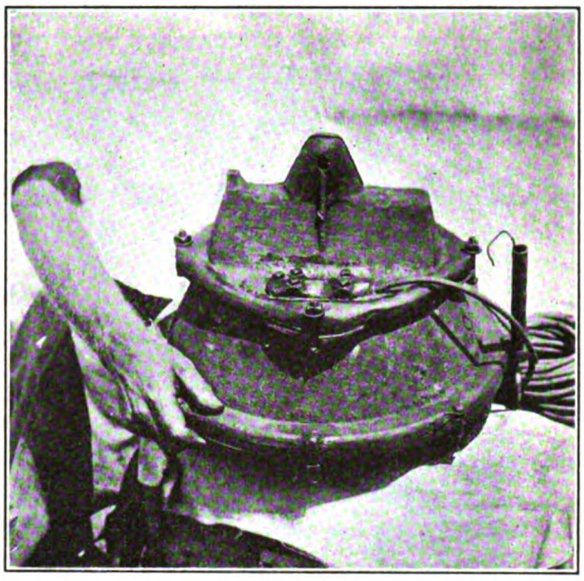


Bottom of the Cooper Hewitt lamp used in submarine photography.

most remarkable photographs ever taken, being that of a life and death struggle between one of the Williamsons and a man-eating shark, the latter receiving a death blow a few seconds after the picture was taken.

The photograph of the diver exploring an old wreck of a ship, 50 feet away from the camera, indicates one of the numerous practical uses to which this most important development may be put.

The American Bitumastic Enamels Company, which received the order some years ago for coating the interior surfaces of the Panama Canal lock gates, has now received an order covering the outside of these important structures. The



Top of the Cooper Hewitt lamp.

contract calls for the cleaning and coating of each gate, one set at a time, and means that during the operation, which is expected to last for four months, it will be necessary to close entirely to shipping one side of each lock chamber while the gates are being coated. The American Bitumastic Enamels Company are naturally elated over the confidence that has been placed in their products by the canal engineers.

The new schooner "Gilbert Island," now being completed in Hendry's Yard at Liverpool, Nova Scotia, has been bought recently by Mr. Yee Wing, general manager of the firm of Tiy Sang & Co., fruit merchants of Sydney, Australia, through the medium of Mr. T. H. Franklin, ship and freight broker of New York City.

This ship, which will be put in service between Hongkong and Australia, will be equipped with an 80 B.H.P. 2-cylinder direct reversible Bolinder's marine oil engine, as also with a 5 B.H.P. engine of the same make for hoisting purposes.

Mr. Wing also placed an order for a 5 B.H.P. Bolinder marine engine to go into the lifeboat on this ship.



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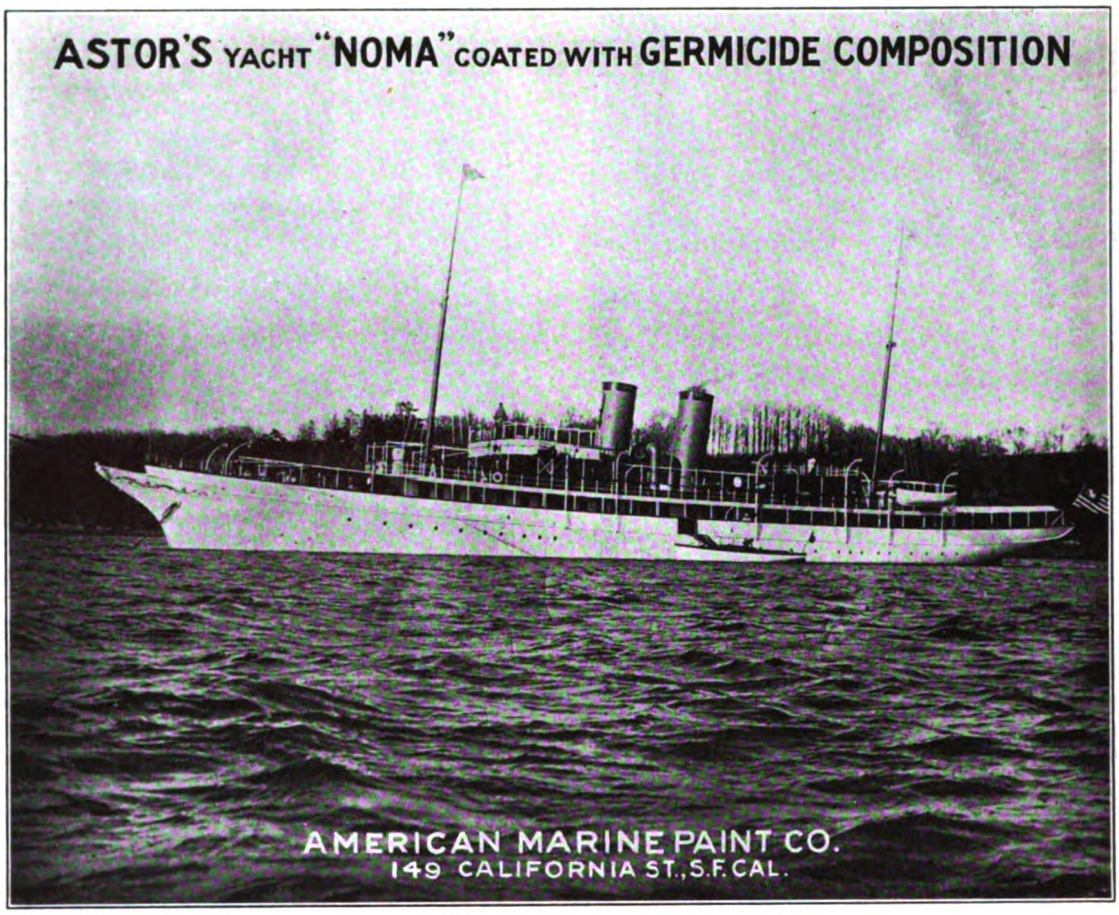
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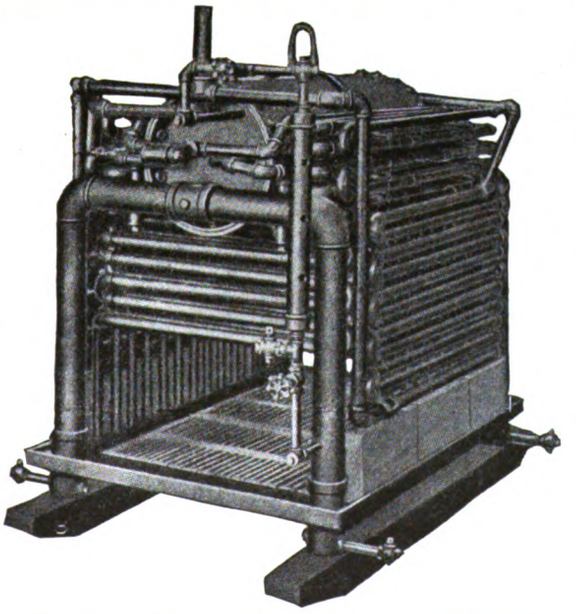
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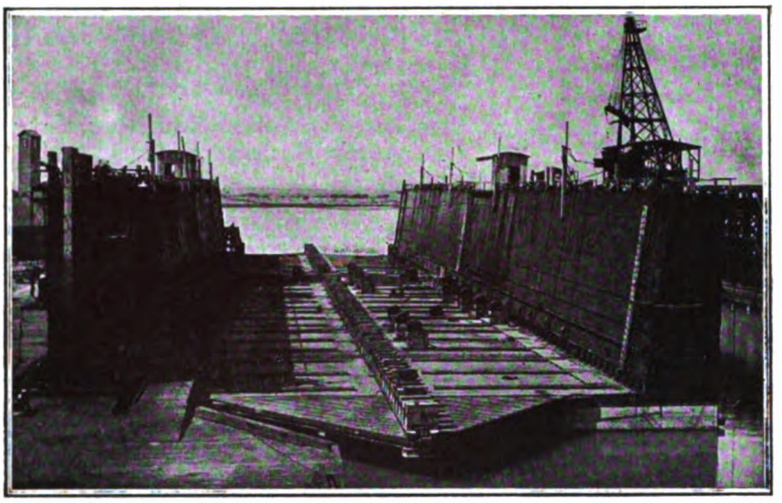
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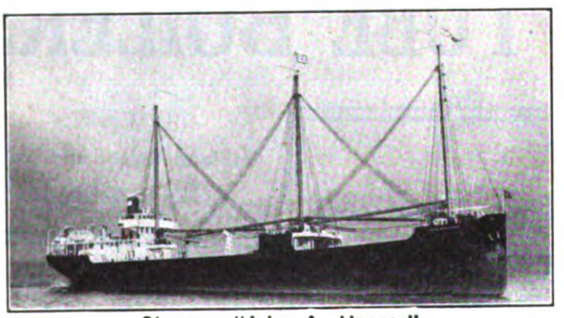
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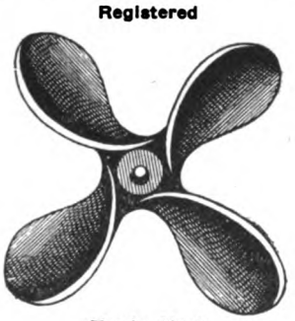
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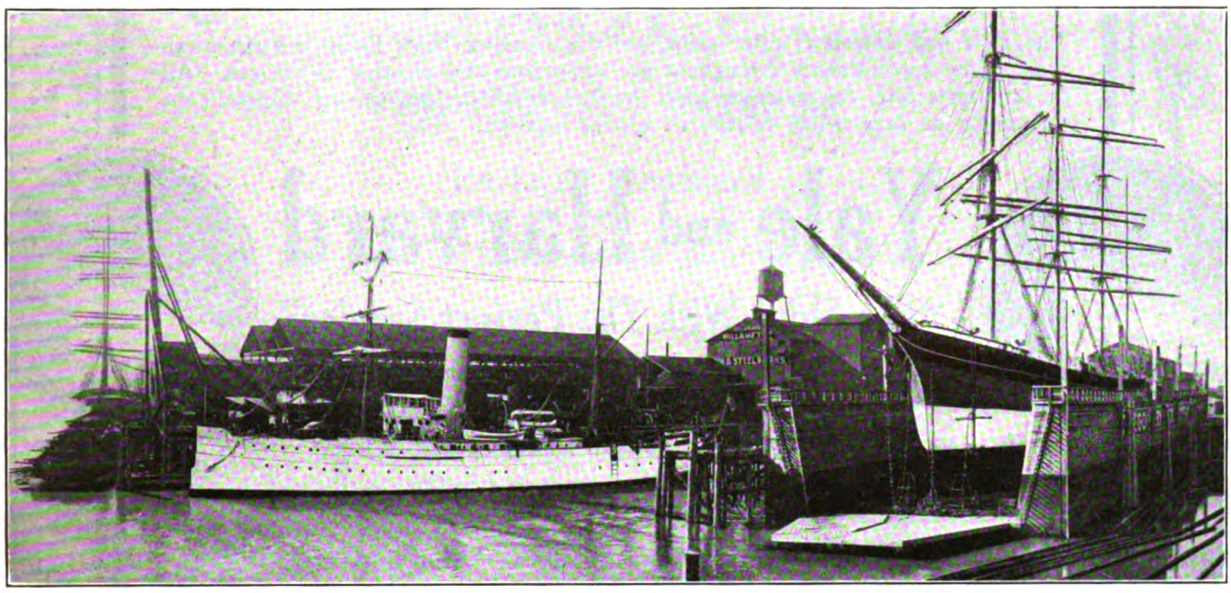
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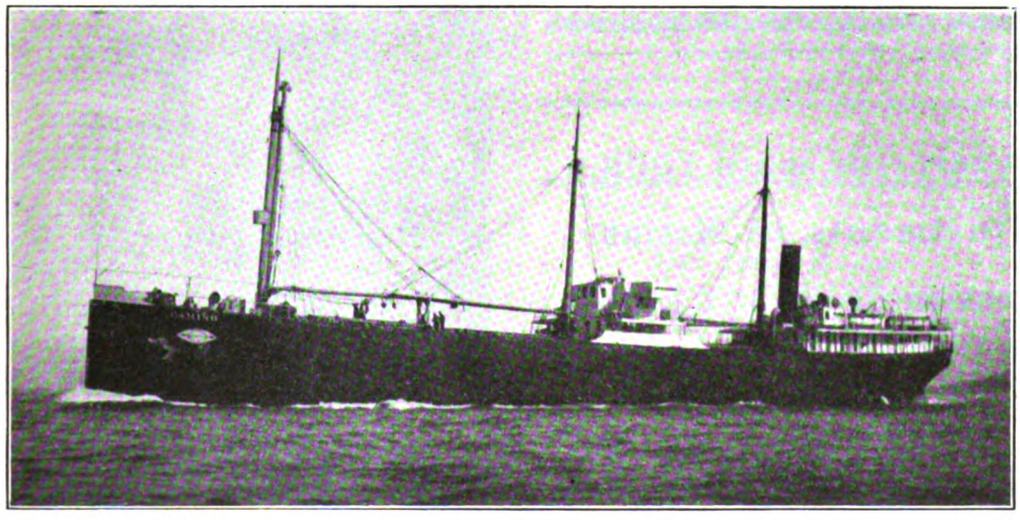
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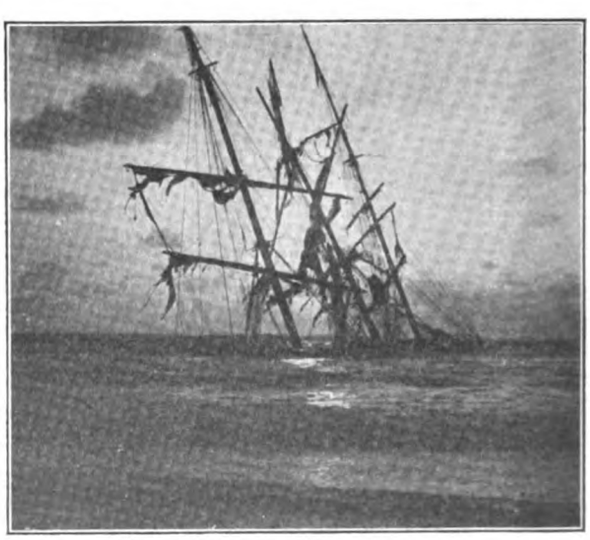
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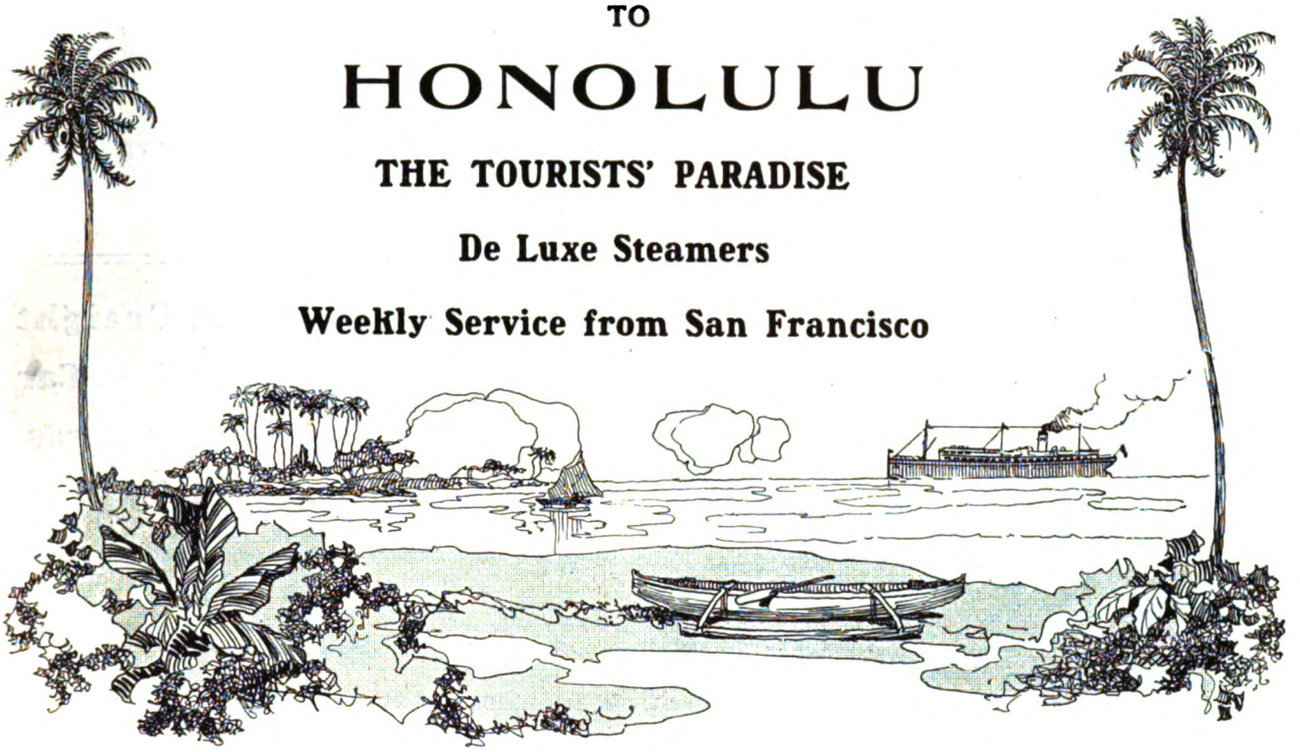
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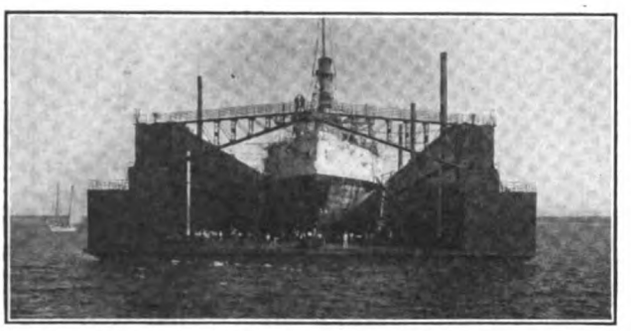
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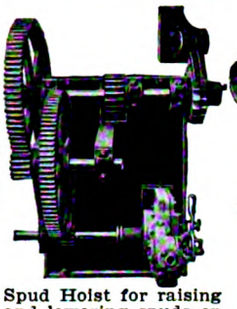
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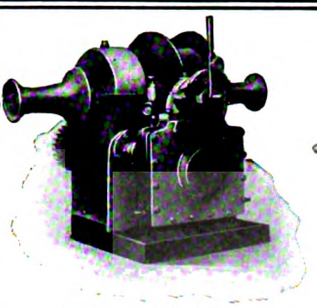
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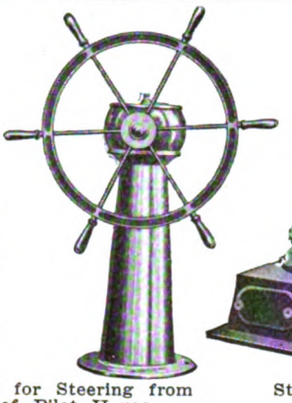
Single Wheel Steam Steering Gear



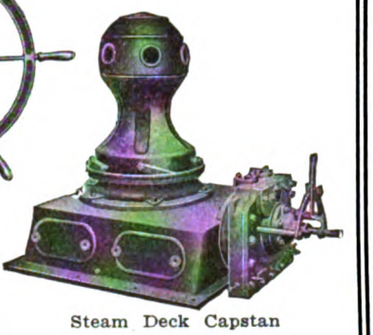
Spud Hoist for raising and lowering spuds on dredges



Gang Plank Hoist



Standard for Steering from top of Pilot House

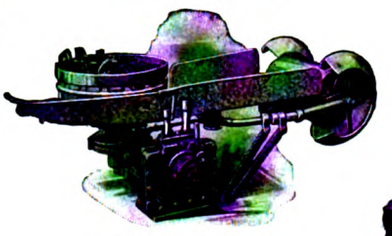


Steam Deck Capstan

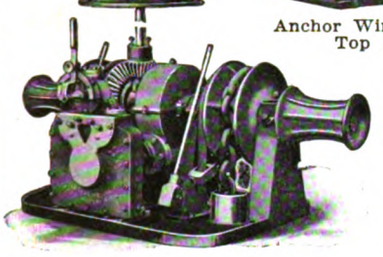




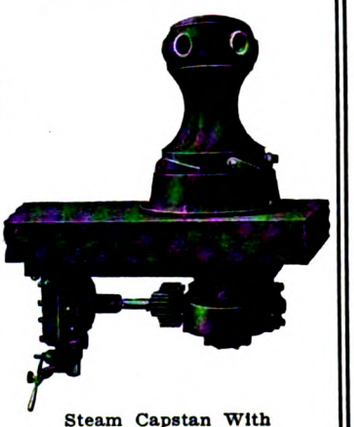
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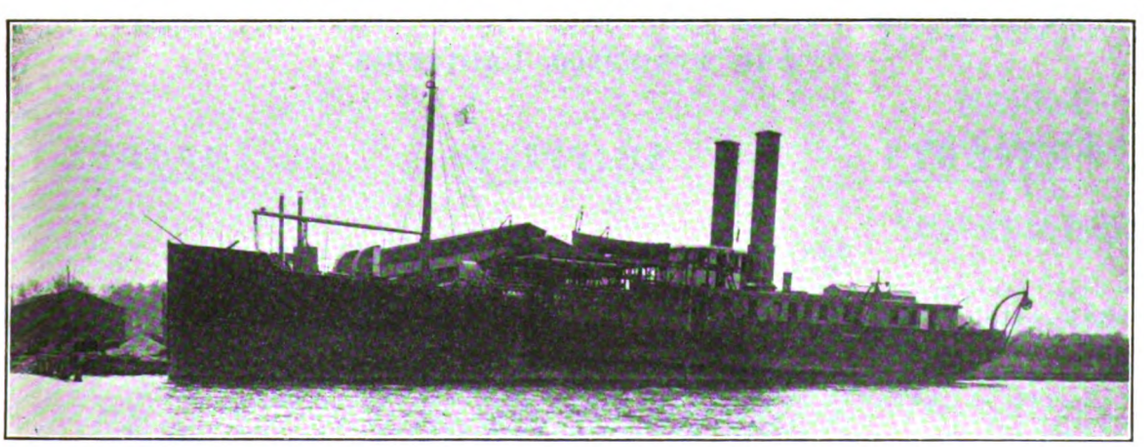
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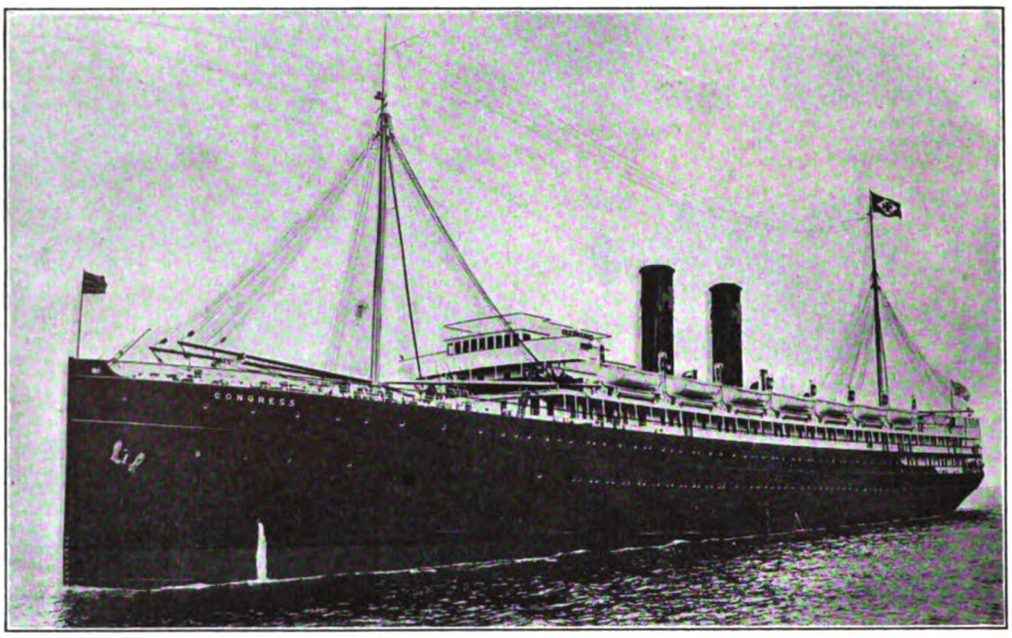
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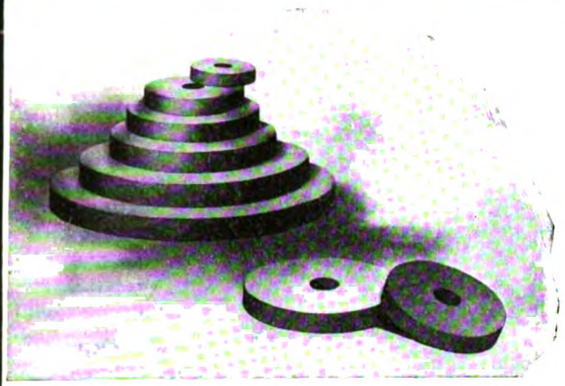
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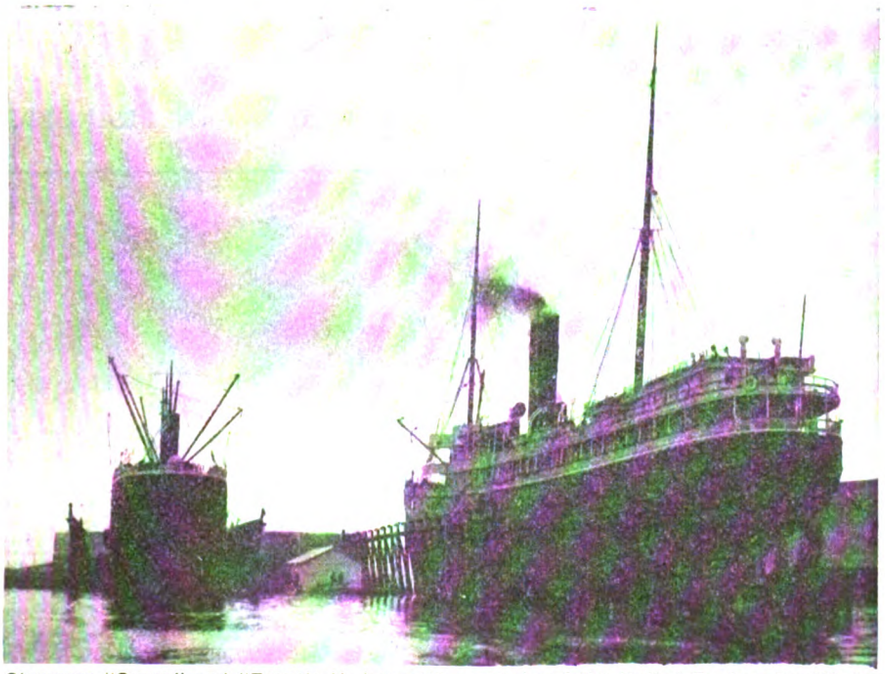
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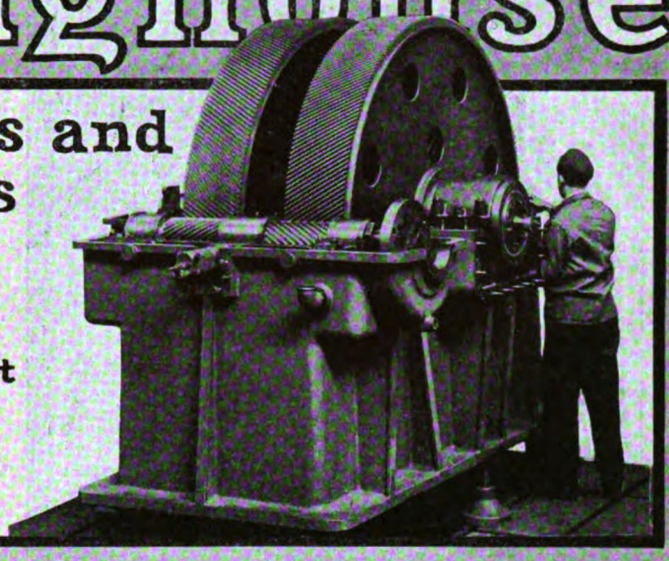
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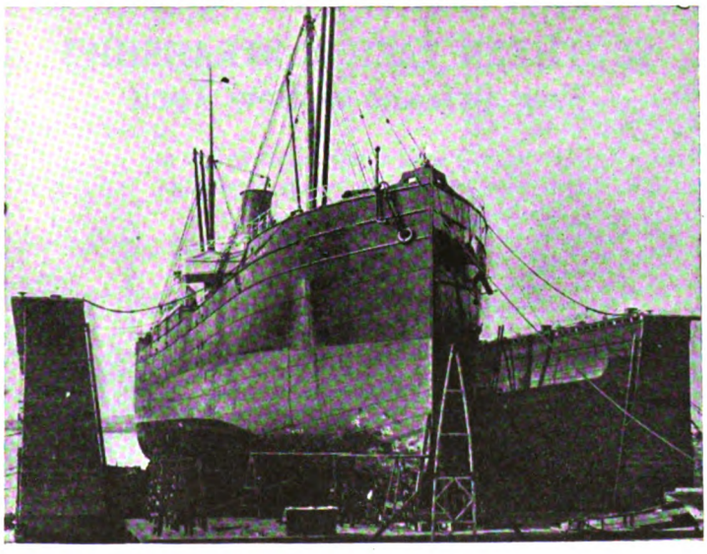


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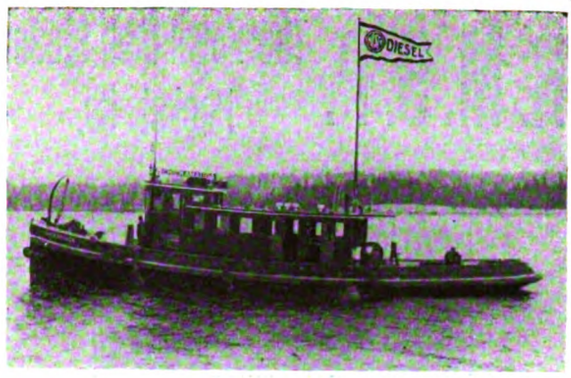


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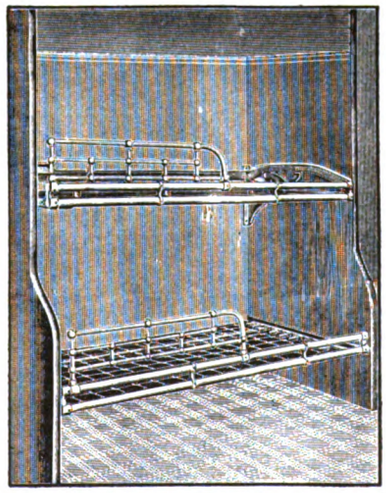
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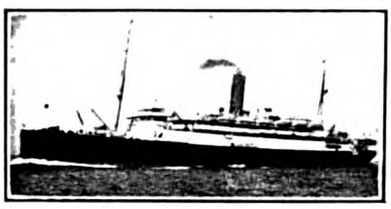
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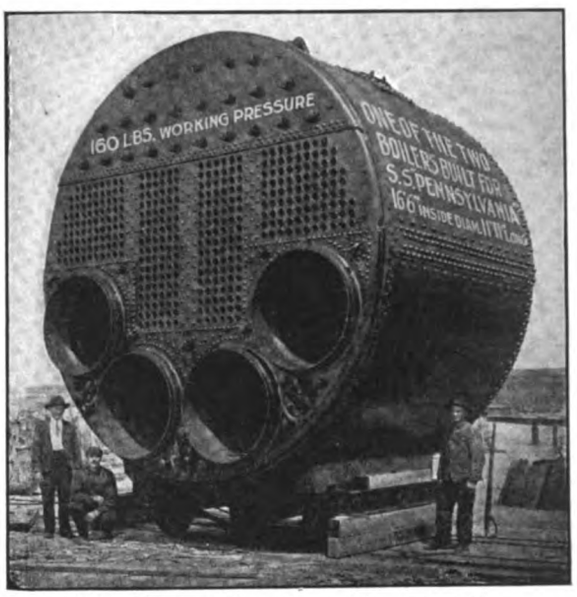
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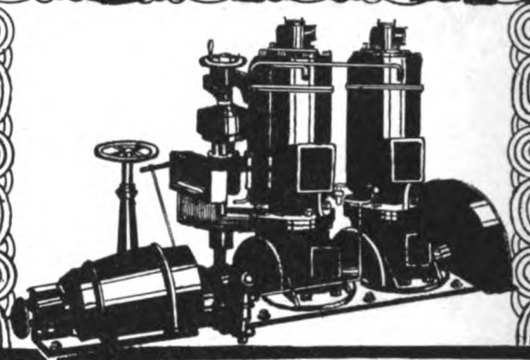
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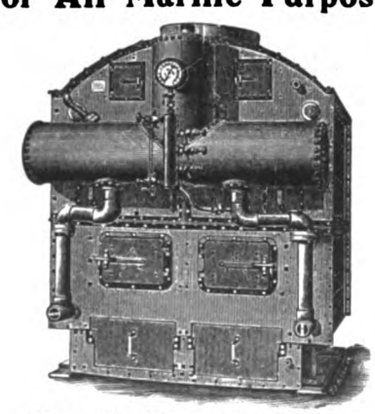
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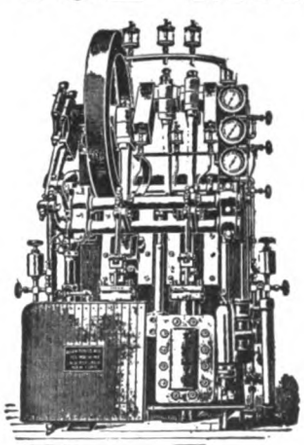
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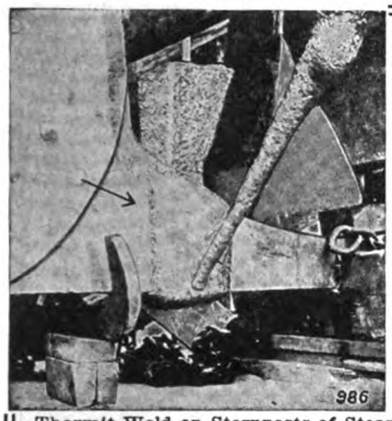
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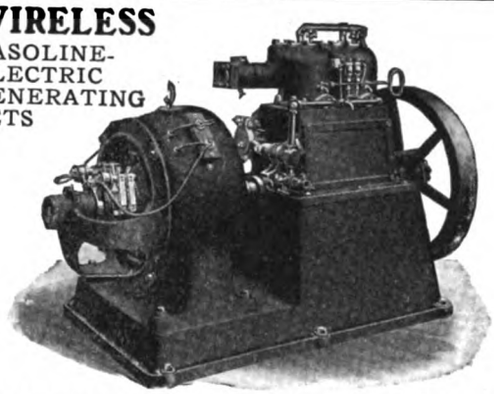
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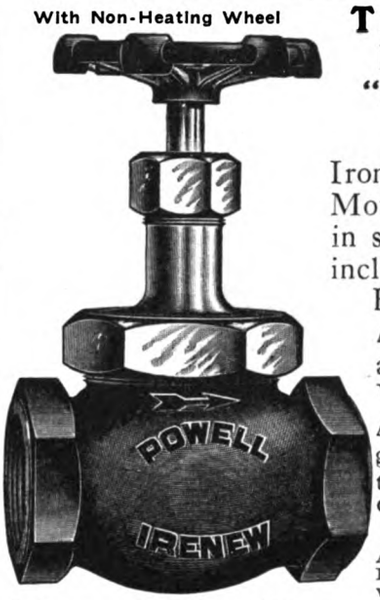
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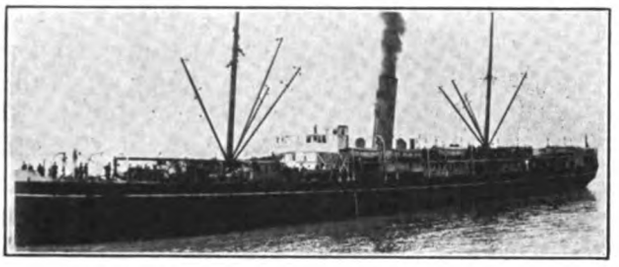
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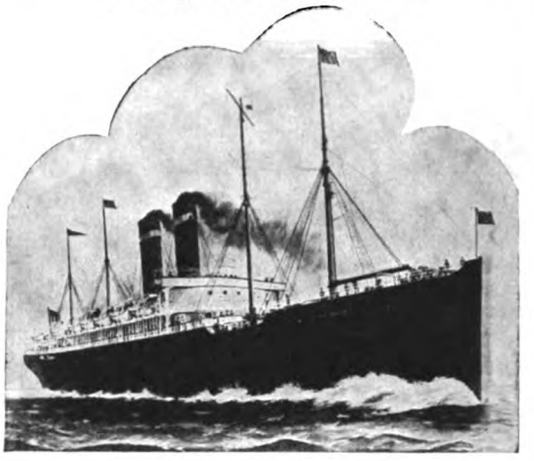


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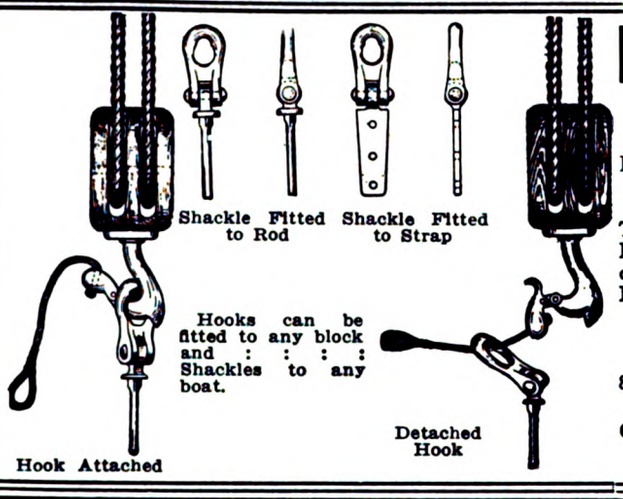
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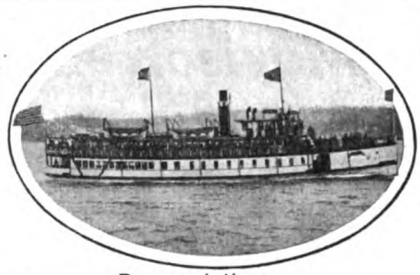


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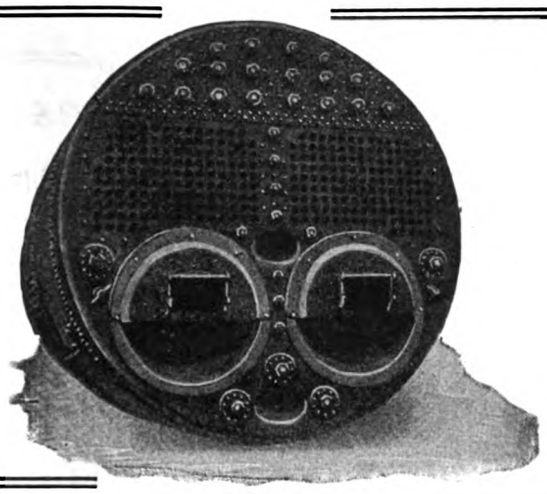
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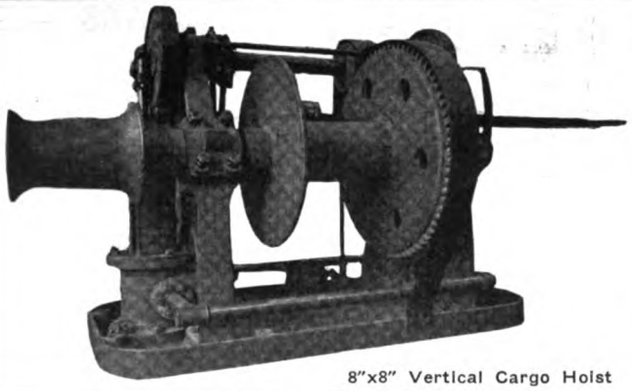


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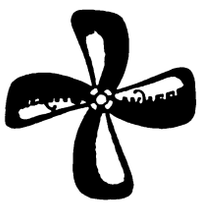
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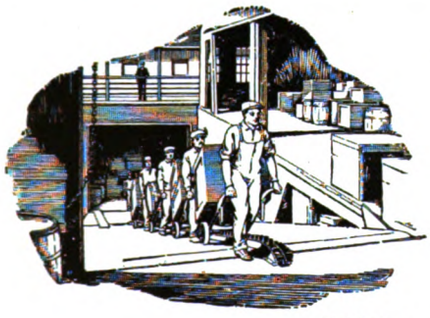
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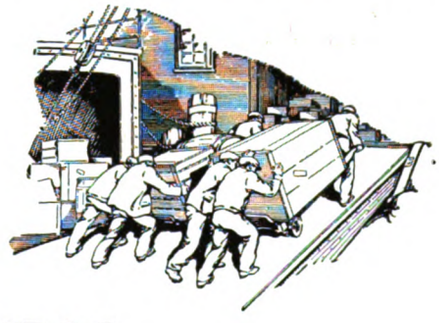
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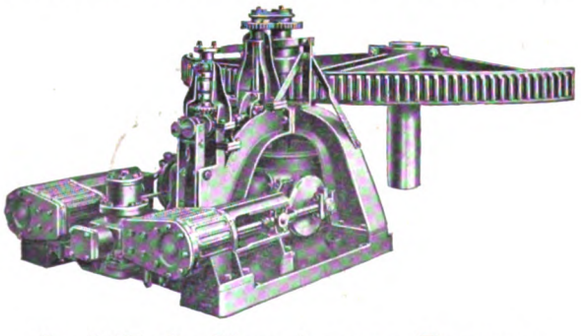
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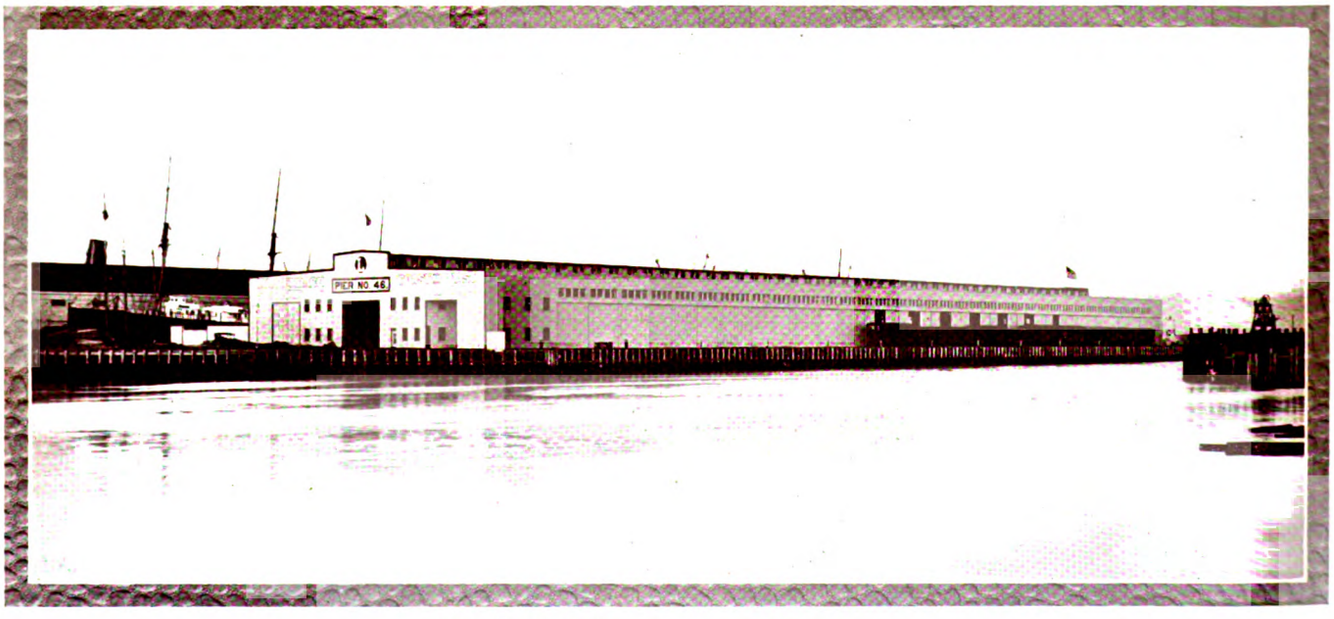
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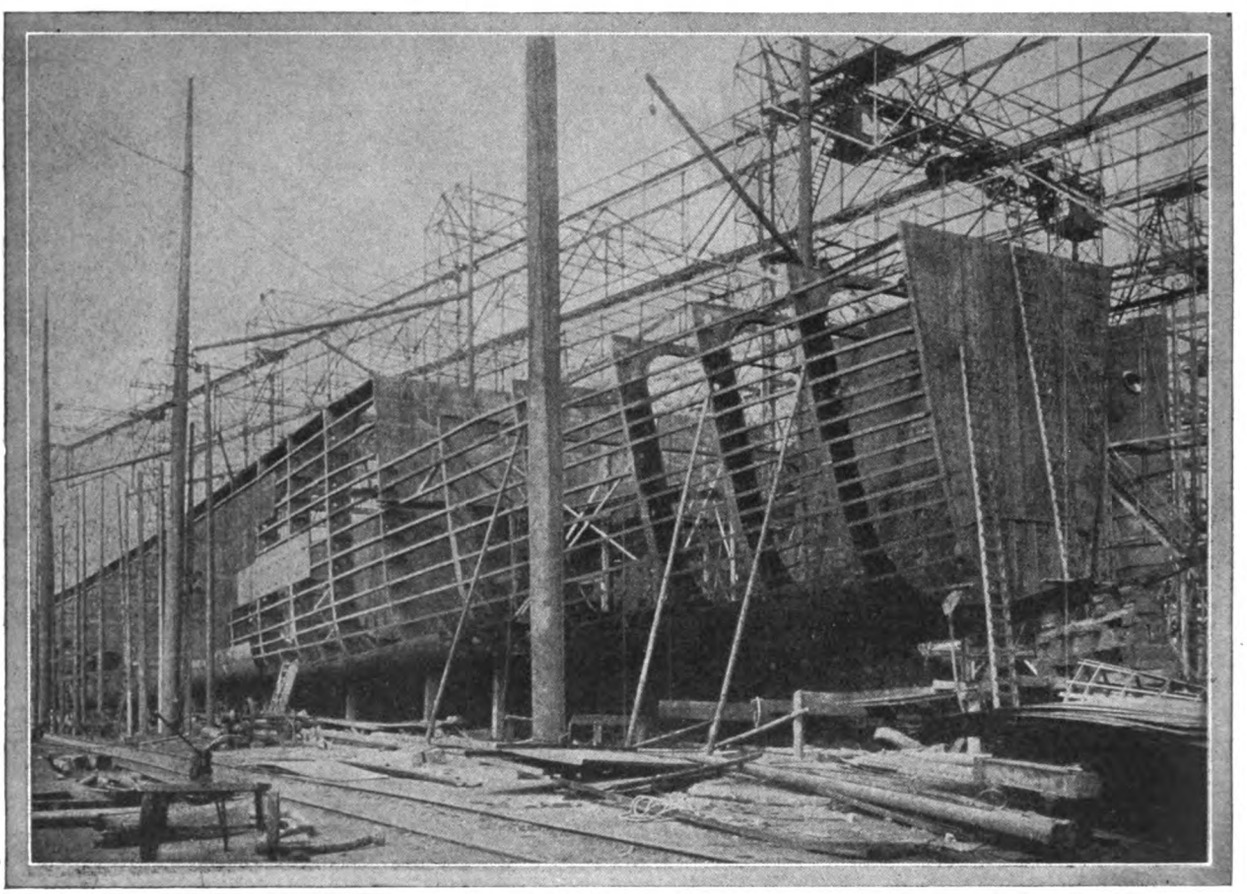
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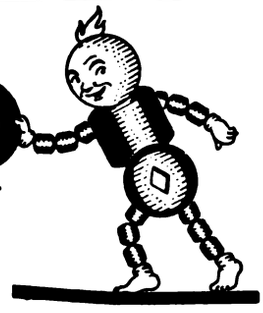
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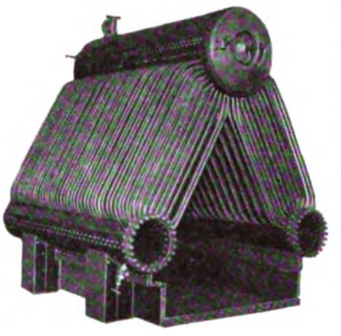
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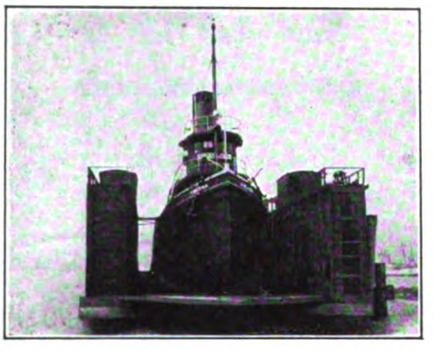
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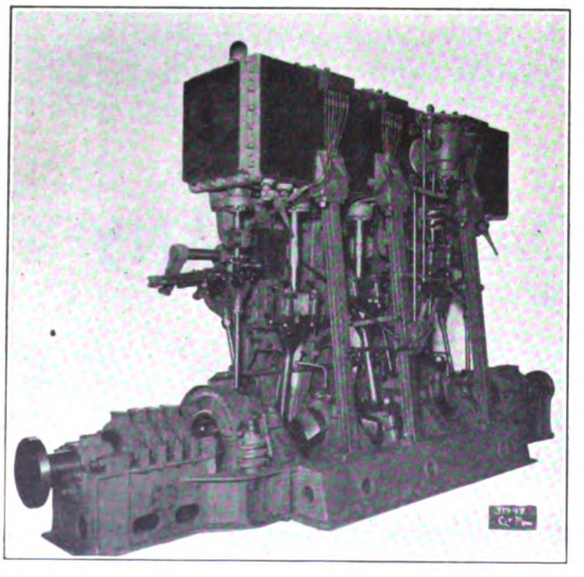
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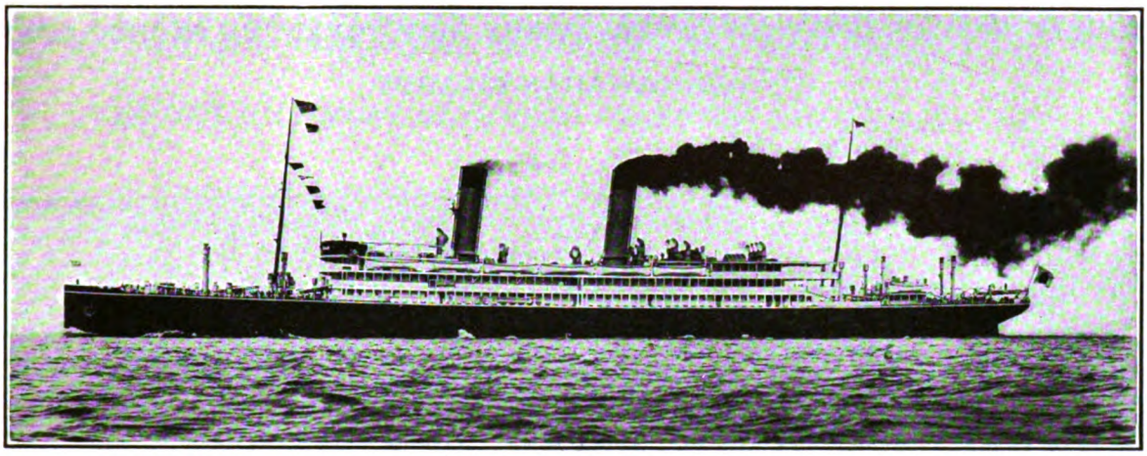
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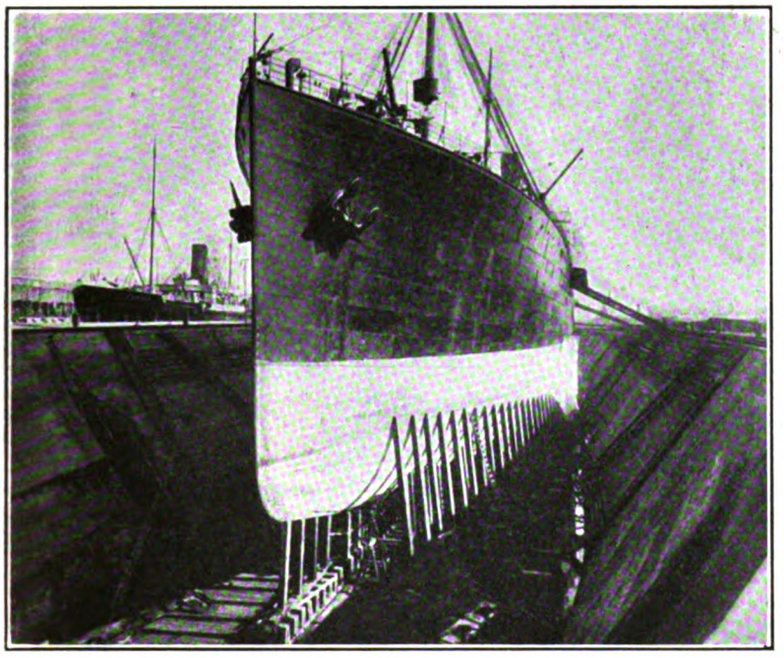
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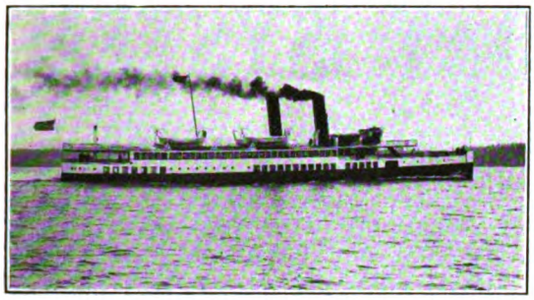
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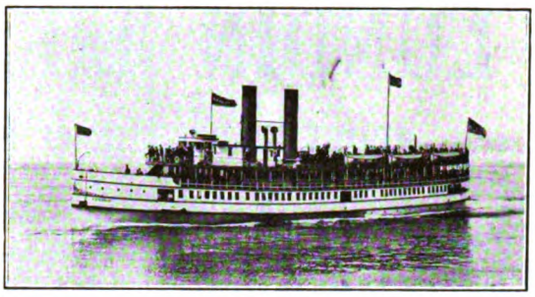
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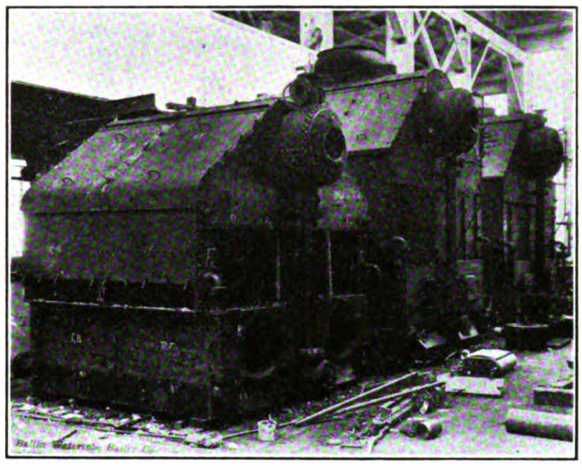
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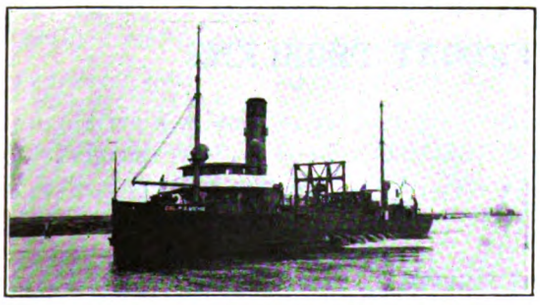


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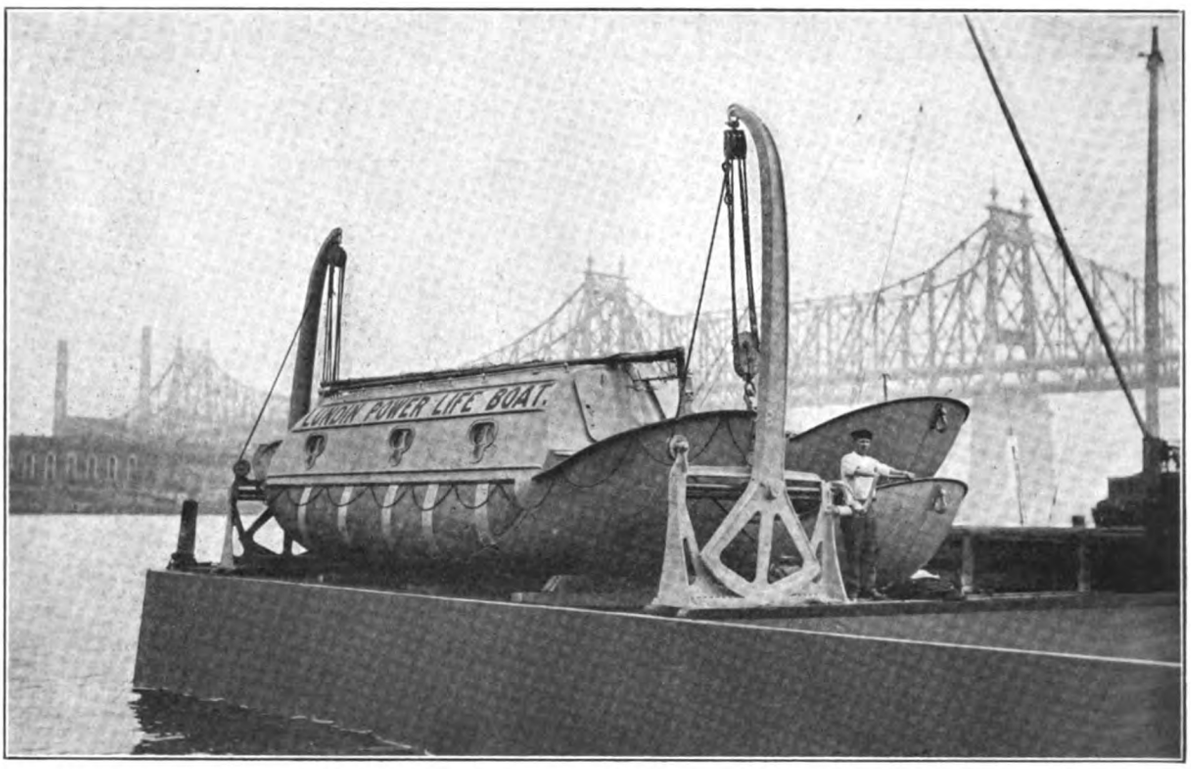
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PACIFIC MARINE REVIEW

LARGEST SHIPPING PAPER PUBLISHED IN THE UNITED STATES.

VOL. XII, NO. 8. SAN FRANCISCO AUGUST, 1915.

American Ships in Last Struggle for Existence

A REVIEW of American participation in the foreign carrying trade is far from encouraging. It makes little difference what method of comparison is used, ship tonnage, freight tonnage or value of exports and imports, for while each of these show a different result they all lead to the same conclusion. Whatever may be our satisfaction at what might be termed the "left-handed" growth of our foreign trade merchant marine through the entry of foreign ships temporarily seeking the protection of the stars and stripes, it must be admitted that this increase has no foundation in permanency.

The Foreign Trade Department of the San Francisco Chamber of Commerce recently compiled the following table showing the net vessel tons cleared from American ports for foreign ports for a period of 25 years up to and including 1914. No method of comparison could be chosen more favorable to a good showing on the part of the American foreign trade merchant marine and yet look at the result:

Year.	American.	British.	All Foreign.	Total.	American.
1889..	3,342,350	6,930,289	10,329,311	13,671,661	24.5%
1894..	3,746,648	9,041,141	15,559,685	17,306,333	21.6%
1899..	3,463,249	12,587,780	18,714,234	22,177,483	15.5%
1904..	3,835,841	12,224,609	20,356,142	24,191,983	15.8%
1909..	4,215,208	14,679,703	25,388,848	29,604,056	14.2%
1914..	5,185,207	20,417,315	34,558,005	39,743,212	13.0%

The above table is exceedingly significant in as much as the American percentage was less in 1914 than it was in 1909. Naturally the year 1915 will witness a slight rise in the American percentage, but unless some radical change takes place in the attitude of the United States towards shipping, the close of the war will witness a drop to a ten per cent. participation in our own foreign carrying trade. The figures quoted in the above table are compiled from the statistical abstract of the United States and it is only fair to state for the benefit of those who are predicting a wonderful growth of American over-seas shipping due to the war, that the year 1914 means the fiscal year which ends June 30 and that therefore the last year given is not affected by war conditions. Under any circumstances there was bound to be a reaction from the increase of the American foreign trade merchant marine through the admission of American owned foreign ships. Already the influx of shipping from under the flags of other countries has practically stopped, due to the fact that the protection afforded by the stars and stripes is no longer necessary and the passage of the Seamen's Act nullifying all benefits and still further increasing the gulf that separates the operating costs of American and foreign ships.

Nearly 600,000 tons of American owned vessels that formerly flew foreign flags are now flying the flag of this country. It is probably correct to assume that this tonnage represents nearly all the American owned vessels that were outside of American registry. While sailing under the flags of other nations nearly all of these ships were essentially American. It is true that they were built abroad, but the profits from their operation came largely to the United States. The United Fruit Company's fleet and a huge fleet of oil carriers engaged to a very large extent in the transportation of an American product make up the bulk of the transferred tonnage and the mere transference of the registry of such vessels has added nothing to the potentiality of the American over-seas fleet; in other words, the amount of new blood added to the American foreign trade merchant marine is practically negligible.

The Seamen's Act will have a marked effect upon our over-seas and our Great Lakes shipping. In the coasting trades where competition is between American ships only, the ultimate effect will be a rise in freight and passenger rates sufficient to meet the increased cost of operation. The

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framers of the Seamen's Bill took the ground that they were seeking to equalize operation costs on every ship clearing from an American port irrespective of that ship's nationality. If these people were honest in their professed convictions their plans have gone sadly awry for already, months before the Act is supposed to become effective on foreign shipping, the great maritime nations are practically conceded to be outside the trammels of the Seamen's Act entirely.

The Seamen's Act and Our Competitors

THE sponsors of the Seamen's Act tried to cover up their real motive under the guise of pretending that their sole object was to place the American flag in the over seas trade by equalizing operating costs as between American and foreign vessels. This was to be accomplished through the wholesale desertion of foreign crews in American ports, giving the Seamen's Union the opportunity to hold up sailings and force union crews on board foreign vessels at American wages. This tempting bait caused many a Senator and Congressman to vote for the Act, honestly believing that it would be a good thing for our foreign trade, in fact, some of our representatives have referred to the Seamen's Act as "The only legislation enacted during forty years for the benefit of our foreign trade merchant marine." The Act was so cleverly baited with promises of marine revivals that even when Congress discovered that the wholesale abrogation of treaties with great world powers was not merely a matter of the stroke of a pen they tried to comfort themselves with the fact that many years ago a single clause of a treaty with Brazil was done away with leaving the remainder of the treaty intact. Indeed the belief expressed by Congressmen and Senators that great maritime powers would give up their rights pertaining to their own shipping in American ports and accept in the place of these rights a measure heavily loaded with expense, restrictions and delays indicates an opinion of foreign diplomacy that has never been borne out by facts. If Mr. Furuseth is the close student of maritime laws and usages that his friends and admirers claim him to be, he must have foreseen that the Seamen's Act would fail utterly when applied to the foreign shipping of any great nation and that when the fogs of contention were cleared away that the measure would appear in its true light as an enactment designed to give the union sailor a strangle hold on American shipping.

The following circular letter issued by the Department of Commerce to U. S. Supervising and Local Inspectors under date of June 5, would indicate that the sections of the Seamen's Act bearing upon foreign shipping will hold good with a few nations which have no ships and be completely nullified in the case of every nation that has a merchant marine worth mentioning:

"Below for your information and guidance, you will find an excerpt from the opinion of the Solicitor, this Department, dated May 18, 1915, in regard to foreign vessels which are required by the proviso of Section 14 of the Seamen's Act to comply with the rules therein prescribed as to life-saving appliances, their equipment, and the manning of the same:

"'. . . it is clear that the only foreign vessels which are required by the said proviso to comply with the rules prescribed by Section 14 of the Seamen's Act are such foreign vessels as are required by Section 4400 R. S., as amended, to comply with the provisions of Section 4488 R. S., namely: All foreign steam vessels carrying passengers from any port of the United States to any other place or country (1) which belong to countries whose inspection laws *do not* approximate those of the United States; (2) which belong to countries whose inspection laws *do* approximate those of the United States, but which countries *do not* by their laws accord similar privileges of exemption from inspection to vessels of the United States visiting them; or (3) which belong to countries whose inspection laws *do* approximate those of the United States and which countries *do* by their laws accord similar privileges of exemption from inspection to vessels of the United States visiting them, but which vessels do not have unexpired certificates of inspection issued by the proper authorities of the countries to which they belong, *except* where the Secretary of Commerce, in the exercise of the discretion vested in him by the last two provisos to Section 4400 R. S. permits such vessels to sail upon their regular routes without undergoing any further inspection than would have been required had their foreign certificates of inspection been enforced.

"'As neither foreign passenger vessels leaving ports of the United States, *without passengers*, nor foreign *freight vessels* leaving ports of the United States, appear to fall within the foregoing category, it is my opinion, and I have the honor to so advise, that the said foreign vessels are not required by the proviso to Section 14 of the "Seamen's Act to comply with the rules prescribed by that Section."'

"It will thus be seen that the provision contained in Section 4400 R. S. for reciprocal inspection is not

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repealed by the proviso of Section 14 of the Seamen's Act, and that the only foreign vessels that will be required to comply with the provisions of Section 14 of the Seamen's Act are those enumerated by the Solicitor in his opinion above referred to.

(Signed.)

"D. N. HOOVER,
"Acting Supervising Inspector General."

It will be seen from the above that Section 14 of the Seamen's Act is not applicable to countries with which the United States is in reciprocal agreement, and this ruling leaves the Act rather high and dry as far as its avowed purpose is concerned in as much as we have reciprocal agreements with nearly all the maritime countries. Mr. Furuseth has always claimed that the Act would equalize the operating costs of American and foreign vessels calling at our ports, but it now appears that the Act was passed under false pretenses and that the time has come for its repeal or modification, since the entire burden it entails must be borne by our own merchant marine. Our impertinent attempt to nationalize the high seas was doomed to failure from the very start and the American ship is left the alternative of paying the piper or getting out of business.



Andrew Furuseth, who, operating behind the mask of securing the American ship an equal chance on the ocean, has succeeded in forcing a law so utterly at variance with treaty rights and international comity that the tremendous burden carried by its provisions falls entirely upon the American vessel and in many cases will utterly destroy long established American steamship lines.

American Shipping to Bear the Brunt of Furuseth's Pet Law

THE Seamen's Act shorn of its power to harass foreign shipping entering our ports becomes doubly effective in eliminating American shipping from the foreign trade.

The credit for the Seamen's Act, if there be any credit, belongs to Mr. Andrew Furuseth, and we may therefore reasonably expect that the new law will be more completely effective on the Pacific Coast than elsewhere. The Act is a Seamen's Union measure and that Union is perhaps stronger on the Pacific Coast than anywhere else in the world. Under such conditions, the attitude of the labor leaders will directly control the increase in operating expenses for all American vessels engaged in the trans-Pacific and costal trades. Aside from possible labor troubles, the increased cost to the coasting vessel must be taken care of by substantial raises in passenger and freight rates, the limit, of course, being reached when the rates rise to a point where the steamship lines cease to be real competitors with the railroads. American ships in the foreign trade have no such resource to fall back upon and it is highly doubtful even in the present abnormal condition of the freight market if they could operate successfully. Under normal conditions where the lowest rate commands the freight the situation would become impossible for the American ship.

Aside from the Great Northern's big steamer "Minnesota," operating out of Puget Sound ports to the Orient, the only regular passenger and freight steamship line under the American flag

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The "Manchuria" coming into her dock. The removal of the "Mongolia," "Manchuria," "Korea," "Siberia," "Nile," "Persia" and "China" from the transpacific routes will mark such a degrading of a national flag by its own legislators as has never before been witnessed in history.

giving regular sailings to Japan and China from the Pacific Coast is the Pacific Mail Steamship Company. This firm has signified its intention of withdrawing its trans-Pacific steamers in November and its avowal has been variously termed as a "bluff" or a "threat" by labor leaders and some of our Congressmen and Senators. It is claimed that the Pacific Mail is doing a larger volume of trans-Pacific business to-day than it has done in years and that it cannot afford to lay up its ships in the face of this business. That the laying up of ships is a very unprofitable proposition we will cheerfully admit, but there are other things even more unprofitable. San Franciscans must have a very short memory indeed if they do not remember when the "Sonoma," "Ventura" and "Sierra," of the Oceanic Steamship Company, lay idle in Mission bay for years, and also that Government action enforced this idleness.

There are several points concerning the impending withdrawal of the Pacific Mail Steamship Company that are worthy of more than passing notice. This line happens to be doing business in direct competition with Japanese lines and while the present abnormal freight conditions have eliminated the competition feature to a large extent, the fact remains that in ordinary years its ability to meet competitors rests entirely upon careful management and the most rigid economy. If the line was withdrawn there is every reason to believe that it would not be replaced by another American line or with the Seamen's Act in force on foreign ships as originally intended, by no foreign line unless such line was operated by some Japanese company.

With this fact in mind, the PACIFIC MARINE REVIEW wrote letters to some fifty of the principal exporters and importers who are using trans-Pacific ships asking their opinions on the following phases of a subject upon which, while there may be differences of opinion, there can be no denial of its importance to the Pacific Coast. The letters sent were worded as follows:

"It has been persistently rumored that the Pacific Mail Steamship Company will be compelled to withdraw its vessels from the trans-Pacific service owing to its inability to comply with the requirements of the Seamen's Act. Investigations we have made seem to verify these reports.

"A conviction is spreading throughout the country that the Seamen's Act must be revised if American ships are to remain in the foreign trade and this sentiment is making itself felt at Washington and the Administration, we understand, has ordered an investigation made as to how the requirements of this Act will affect American ships now operating across the Pacific.

"For the past two years the PACIFIC MARINE REVIEW has been fighting certain clauses in the Seamen's Bill which it deemed detrimental to the best interests of American commerce and we are ready and willing to keep up this fight indefinitely.

"In order that we may obtain a comprehensive understanding of the attitude of those who will be affected by the withdrawal of American ships from trans-Pacific routes, we are writing this letter to

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the principal firms interested in trans-Pacific imports and exports, and would respectfully ask your opinion upon the following phases of this subject:

"(a) If American steamers are withdrawn from the trans-Pacific routes, leaving this traffic entirely to foreign steamers, what will be the effect on freight rates and the rapidity and regularity of service?

"(b) If transportation across the Pacific is dependent entirely upon foreign lines what will be the opportunities for American exporters to obtain Oriental trade when, in soliciting such trade, they are in competition with foreign firms; in other words, will the American exporter be able to obtain satisfactory transportation service for his goods?

"(c) What will be the general business effect on San Francisco, due to the loss of the expenditures which have been made by the Pacific Mail and others for supplies, repairs, wages, etc.?

"(d) What will be the general business effect on San Francisco, due to the partial loss of tourist travel resulting through the withdrawal of several large passenger steamers?

"(e) Do you see any hope for American ships on the trans-Pacific if compelled to operate under the provisions of the Seamen's Act and in competition with heavily subsidized steamers, considering that the Japanese steamers, at least, are not financially affected by the requirements of that Act, being already manned with officers and crews all speaking a common laguage?

"Our sole desire in this matter is to secure a consensus of opinions from prominent firms interested in the Oriental import and export trade in order that we may speak with authority in regard to the sentiment of those most vitally interested. "Very truly yours,

"PACIFIC MARINE REVIEW."

Up to the time of going to press 50 per cent. of those written to had answered and the average reply was something as follows:

A-1. Freight rates, rapidity and regularity of service, are dependent upon competition, and the withdrawal of a line of steamers would naturally result in higher freight rates and poor service, unless the steamships withdrawn were replaced by others.

A-2. The withdrawal of American steamers will result in higher freight rates and less frequent sailings, to the detriment of Pacific Coast shippers.

A-3. If American steamers are withdrawn from transpacific routes, undoubtedly freight rates will advance and the service we may expect will be that which suits the steamship companies best, irrespective of shippers' requirements.

B-1. Unless the controlling interests in foreign lines were also exporters of merchandise to the Orient, transportation services for American goods would not be affected. In other words, if there is an export business to be done, transportation is quite as likely to be furnished by foreign lines as American.

B-2. As we will have to depend largely upon Japanese owned steamers, they will discriminate



The "Mongolia" at Honolulu. The intense Americanism of the people of the Hawaiian Islands will be touched to the quick by the removal of the Pacific Mail vessels.

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in favor of freight to and from Japan and thus make shipments to Chinese and other ports more difficult.

B-3. If transportation across the Pacific is dependent entirely upon foreign lines, the foreign countries whose lines are thus operating will have every advantage in trade, and the writer heard this phase of the situation very well expressed in a statement by a prominent American who said: "That the policy of this country might be compared to a San Francisco department store who left the delivery of all goods it sold to the delivery system of its largest competitor."

C-1. The business effect would be detrimental to the interests of San Francisco, as there would be less expenditure in this city because of the withdrawal of the P. M. S. S. Co.

C-2. The loss of expenditures now being made at this port by the Pacific Mail Steamship Co. will be a distinct loss to the business community here.

C-3. If the Pacific Mail S. S. Co. and other American transpacific steamship lines go out of business, naturally their home ports would suffer in general business due to the fact that the foreign lines would buy all their supplies, have all their repairs done, and the employees would spend the largest part of their wages at their home ports in their own countries.

D-1. The loss of tourist traffic would be but temporary as, if there is a profitable business of this kind to be done, the necessary vessels will be supplied by someone.

D-2. Less frequent sailings from this port will naturally result in partial loss of tourist traffic to and from the Orient.

D-3. Many American tourists who go abroad hesitate to travel on lines operated by Orientals, and the tourist traffic of these people would be lost to San Francisco.

E-1. So far as we are informed, we do not believe American ships can operate profitably on transpacific routes under the provisions of the Seamen's Act.

E-2. As the Pacific Mail Steamship Co. has announced their inability to continue their line to the Orient owing to the provisions of the Seamen's Act, we do not see any encouragement for any other American shipowners to enter this service. We believe that the effects of this Act will be particularly detrimental to the commerce of the Pacific Coast with Asiatic countries and without accomplishing the effect which was intended by those who were instrumental in having this Act passed.

E-3. We can see absolutely no hope for American ships on the transpacific routes, compelled to operate under the provisions of the Seamen's Act. It would just be as impossible for these lines to continue to operate as it would be for American factories to operate in competition with the cheap labor of the Orient and India without adequate protection.

From the numerous replies received to the PACIFIC MARINE REVIEW'S letter, the above answers were picked as representing the widest range in the opinions expressed. That such a large percentage of the important firms regularly exporting or importing goods across the Pacific express themselves in such unmistakable terms concerning the trade value of American ships may surely be taken as an indication that the possession of an American Foreign Trade Merchant Marine is coming to be appraised at its true value along our seaboards at least.

Not one reply to the letter of the PACIFIC MARINE REVIEW contained any indication that the writer considered Mr. Furuseth's claim that the Seamen's Act would equalize operating costs the world over to be anything else than pure rubbish, and just how Congress and the President of the United States could have been induced to pick up a hornet's nest on the plea that it was nothing but a honeycomb is difficult to understand.

La Follette Bill Favors Canadian Shipping

AMERICAN shipping on the Great Lakes, both freight and passenger, has assumed immense proportions, and to this shipping the Seamen's Act presents a problem almost as difficult to solve as that of the ocean marine. In a letter to the New York Times, the Secretary of the Lake Michigan Passenger Lines Association uses the following language:

"Chicago, June 24, 1915.

"To the Editor of The New York Times:

"Your editorial on the Seamen's Bill, issue of Saturday, June 12th, strikes a highly responsive chord on the Great Lakes, though you may not have been aware of the fact that the Great Lakes are hit as hard, if not harder, than any other division of American shipping.

"The collapse of the policy of arbitrarily notifying more than twenty foreign powers of the abrogation of treaties affected by the Seamen's Bill has left the Great Lakes American shipping to bear the brunt of this oppressive and unreasonable legislation.

"Thus the house of cards built by Andrew Furuseth tumbles about his ears. No later than June

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14th a signed communication by him in The New York Sun gives as the fundamental basis for his whole campaign the belief that foreign shipping powers would be compelled to raise their standards to those of American shipping.

"Now comes an official announcement from Washington that foreign shipping is not affected by the Seamen's Bill—and everything that has been said about the stupidity of the legislation has been fully borne out. The American merchant marine has been torpedoed again—this time from within.

"Unless the Seamen's bill is modified the Great Lakes lines are practically forced out of business after November 4, 1915. We have built up the finest passenger and packet freight service in the United States (all tending to maintain lower railroad rates), only to see the service annihilated or handed over to Canada by Senate Bill 136.

"Our most substantial point of opposition to this bill is that it fails to discriminate between (for example) a Great Lakes excursion steamer, always in sight of land, traveling in shallow water, and with passing ships invariably in sight, and the seagoing liners that travel from New York to Bombay.

In short, the sponsors of the Seamen's Act sought, or so professed, to place an equalizing burden on the shipping of the entire civilized world and now that this utopian dream has failed they are demanding, cost what it will, that American ships shoulder the load. The situation will undoubtedly be remedied by the repeal or modification of the Seamen's Act. This action will be forced upon the Government through the destruction wrought by the measure and the only question in our mind is, "How much damage to our shipping industry will have to occur before Congress is willing to admit that the Seamen's Act is a mistake?"

From one of Those who Foot the Bills

THE Seamen's bill is causing widespread comment and agitation due to many things which will operate to the injury of our shipping industry, and also to the fact that the bill calls for the abrogation of treaties with foreign nations who protest against such treaty abrogation and the possibility that the enforcement of the bill in some of its measures might involve the United States in serious international complications.

In reviewing this bill with a knowledge of its original sponsors and knowing its widespread notoriety and success with which it has met in having passed both houses of Congress and having been signed by the President, one is reminded of the biblical quotation, "From corruption, cometh incorruption." No man worthy of the name can gainsay the fact that the Seamen's bill combines righteous and just demands for the control, safety and care of humanity upon the high seas, and in so far as these regulations are concerned, nothing but good can result from the adoption of the bill. It is, however, one of the unfortunate social conditions that in these days righteousness is too often capitalized and it is upon the theory of capitalizing righteousness that the sponsors of the Seamen's bill have used righteousness in this bill to hide its true and selfish motive.

To the layman this motive is so carefully hidden and arguments so cleverly presented that he fails to see wherein the entire bill is not altogether of the most righteous and correct consideration of the situation which it has been enacted to control. This bill came into great prominence after the terrible "Titanic" disaster due to the fact that the bill provides extreme measures regarding the safeguarding of human life upon the ocean.

Let us go back a few years with the originators and sponsors of this bill and see what they were doing with regard to the safeguarding of human life and we will find that in their efforts to dictate to their employers, the owners and managers of ships, they used all means to an end to intimidate these owners so that they might surrender their property to the dictates of organized seamen. If this was the original line of procedure of the sponsors of the present Seamen's bill, why have these individuals become so solicitous in the interest of safety at sea for their fellow men? It is the same interest which plotted the attacks in the earlier years of that organization, but from experience they have found that there was more to be accomplished in appealing to the righteous sentiment of society than by conducting their organization in the piratical manner which they formerly adopted. Results have shown the wisdom of that course. The motive, however, is the same as it was originally, viz.: the strengthening, upbuilding in personnel and finances of the Seamen's union. In this regard the recent legislation is purely and simply class legislation. Granting that in so far as light and well ventilated accommodations should be provided for men going to sea, all necessary requirements established for their moral and social uplift and practicable appliances for safety of life, is worthy legislation, we cannot see why this country should undertake to enact legislation abrogating treaties with foreign nations to the extent of making it lawful for seamen on for-

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eign vessels to violate their contracts with their employers, leave their ships in American ports and forcing these ships to take on crews at a rate of wage established by the seamen's union. We can, however, all see where such legislation would be absolutely repugnant to foreign ship owners, also that it would work greatly to the advantage of the seamen's union in this country.

The union would profit by it in several ways. From Scandinavia, Great Britain and Germany they would obtain the best recruiting material for their union and find a supply of men to extend their demands to the intercoastal trade as well as the coasting trade and in return work off their less desirable men on the foreign ship and also become independent of any shipping master, for the reason that seamen on foreign vessels could be negotiated with in the open, conducted to union headquarters and induced to leave their ship, without fear of molestation or prosecution by the officials of this government or by the consuls representing the foreign ship.

In support of the bill its sponsors offer the argument that by allowing the foreign seaman to leave his ship in American ports, his ship will undoubtedly become deprived of a crew, owing to the fact that the men can ship in American vessels for much higher wages, hence when ready for sea, they will have to ship their crews at the same rate of wage placed on American ships and thus will be overcome one of the great obstacles in cost of operation which the American Merchant Marine is at present confronted with, but we have yet to learn how this is to work out with the great number of tramp ships coming to our country with Asiatic crews, which are prohibited from coming ashore at all by our immigration laws. This they claim is provided for to a certain extent in demanding that the major portion of the crews shall understand the language of their officers, supposing that in practically all cases the vessels will be officered by Europeans. We know, however, that Japan is fast building up a merchant marine manned and officered by Asiatics, hence in connection with this country, that part of their argument is of little or no value.

There is no question but what in the past the ship owner has sacrificed to some extent proper habitation and necessary conveniences for seamen to cargo space. There has been altogether too much difference in accommodations accorded to the forward and after end of the ship. Many abuses have crept into the business of employing seamen and this Seamen's bill has unquestionably turned the attention of our people towards uplifting and bettering the condition of seamen in American ships which can only redound to the credit of the country and the betterment of the service, hence the statement that from corruption is born incorruption, so may it be hoped that through the medium of careful consideration and studying of this all-important subject, our legislators and men in high office will be able to segregate the good from the evil and by the aid of a competent commission so correct our navigation laws that the United States may again take its place upon the high seas as the leader in oversea transportation.

The control, the command and direction of a ship must necessarily originate from and be dictated by the management and officers in command, but this control should be so regulated by the government as to accord a fair, just and righteous treatment to all concerned.

Unfortunately many of our lawmakers feel that they owe their position to the political support of organized labor, hence are influenced in support of class legislation rather than the practice of statesmanship in support of that which is for the best interest of the whole. Hasten the day when this shall not be the case and when such important matters as our Merchant Marine may be eliminated from politics and adjusted on a high plane of national honor and pride.

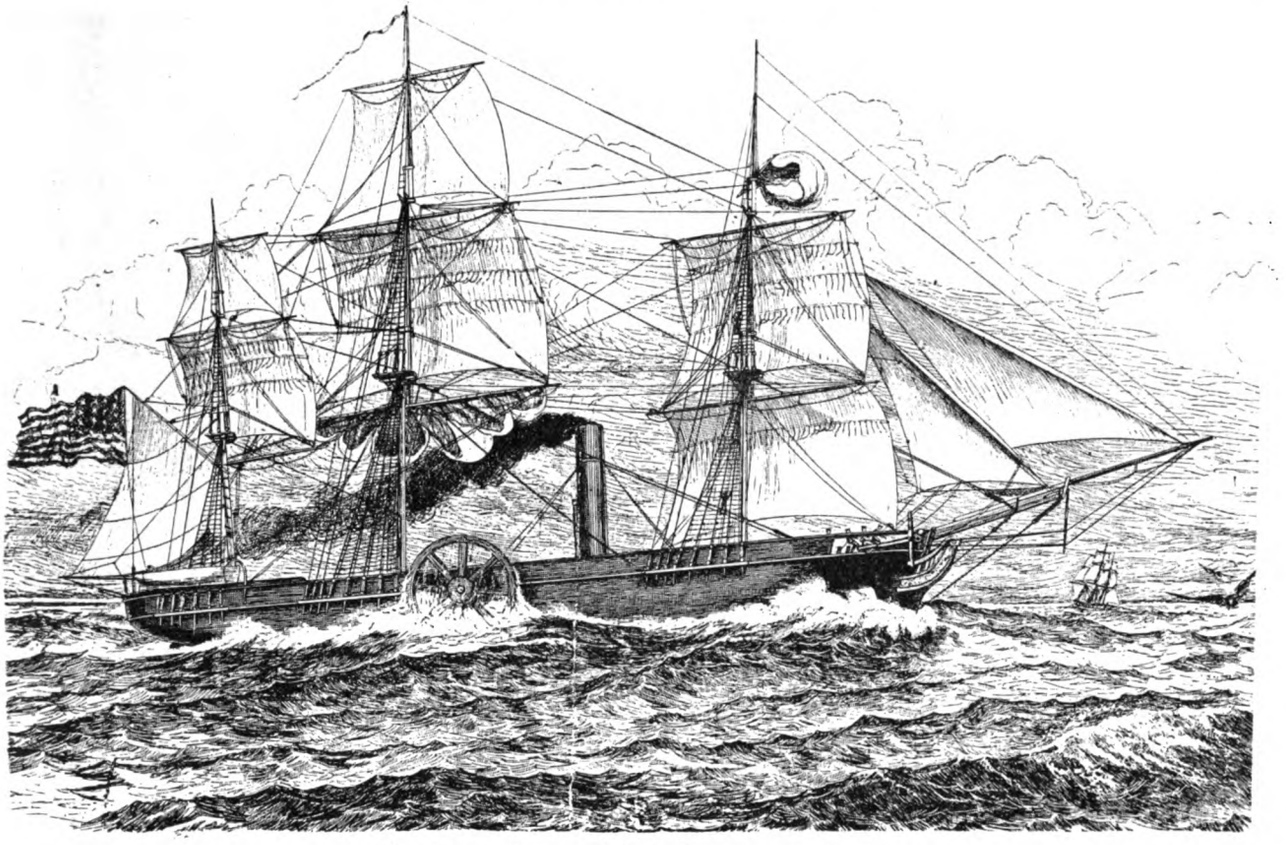
Respectfully, A SHIP OWNER.

The Story of the Steamboat

By RANDOLPH I. GEARE.

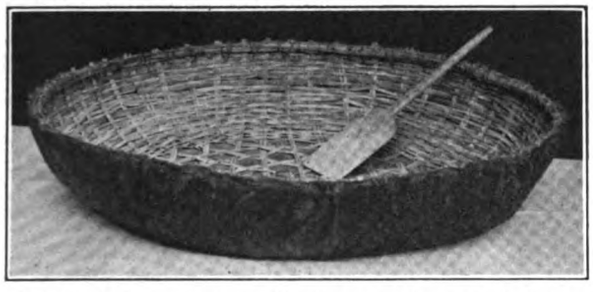
THE honor of the earliest maritime enterprise is generally conceded to the Phœnicians. The Egyptians, too, are credited with having constructed both row-boats and sail-boats as early as the year 3000 B. C., and this belief is supported by the fact that on a monument of about that time there is represented a vessel propelled by forty oars, and provided with two masts, which, curiously enough, as in the canoes of Ecuador, lean towards one another, being fastened together at the point of juncture. Their sailing ships traversed the coasts of the Mediterranean, and similar ships were employed by nations possessed of seagoing vessels that traded among the Egyptian seaports. Later, the Assyrians became imbued with naval activity, after their conquest of Phœnicia, whose forms of vessels they closely adopted, including large merchant ships capable of carrying immense cargoes and of traversing the Mediterranean Sea, and even perhaps of sailing around Africa. To the Assyrians also probably belongs the credit of inventing the classic "biremes" and

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The steamer "Savannah," the first transatlantic liner.

"triremes" with their two and three banks of oars. The former were afterwards adopted by the Greeks for use as ships-of-war, the first of which is said to have been built at Athens about 700 B. C., by Aminocles. In like manner the Scandinavians imitated the Phœnicians in the construction of their ships; and in the Norse vessel, too, is seen practically the same form as was exemplified in the Greek galley.

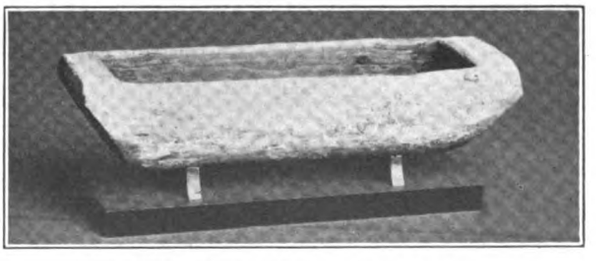


A Parachal, as made on the Bowani River, East India.

A peculiar feature of all these ancient war-ships is that their sides were not parallel amidships, but bulged slightly forward, although vertically perpendicular.

In America the earliest known form of boat was for centuries used by Indian tribes, and this probably had its origin simultaneously, or nearly so, with those of regions far distant. It consisted merely of bundles of rushes fastened together, or else of a log or the trunk of a tree, without rudder or paddle. Later, a pole was added for propelling or guiding it. Next, several logs were fastened together, to form a raft capable of carrying a whole family with its household belongings. The early navigator soon discovered that his raft was liable to become overfreighted, thereby spoiling his cargo or wetting his passengers, and thus he conceived the idea of hollowing out a log by the application of fire or with the aid of primitive tools. In this way came into existence the "dug-out," the simplest form of canoe. Such vessels are even associated with the Stone Age, specimens of them having been obtained from the prehistoric Swiss-lake dwellings, from the bogs of Ireland, and the estuaries of England and Scotland, where some were excavated from a depth of twenty to thirty feet below the surface.

The ancient Peruvians made "balsas," and they are still in use in the southern part of that country. They are composed of two thick bundles of rushes laid parallel and fastened together, and are provided with two masts, as in Ecuador, similar



The simplest form of early dugouts.

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to the old Egyptian boats already mentioned. Another form of balsa is used both on the Atlantic and Pacific coasts, being usually a simple raft of parallel logs fastened together and steered with a paddle.

The natives of the Marianne, or Ladrone, Islands employed dugouts pointed at each end and fitted with a lateen sail supported by a gaff, the foot of the sail being stiffened by a boom. A platform, extending to the outrigger, served as a deck for passengers and freight.

Throughout the Malayan Archipelago the Polynesian dugouts are in general use. They are furnished with outriggers for use when going to sea, consisting of logs rigidly connected with the canoe by means of cross-pieces, whose weight prevents the craft from capsizing to leeward, while the buoyancy of the log preserves its equilibrium, should it incline too far in the opposite direction.

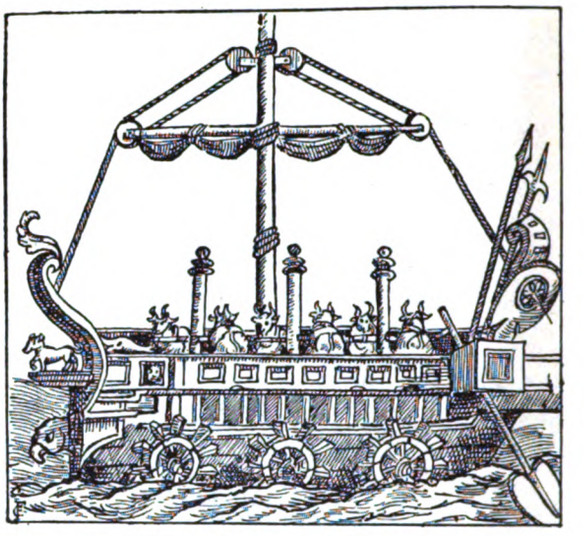
In the Euphrates region the ancients used to navigate the rivers seated in inflated goatskins; or else goatskins were attached beneath the rafts to increase their buoyancy.

On the northwest coast of Australia is still found the single log raft of buoyant wood, not hollowed out, but pointed at each end, and also rafts made of reeds.

In New Guinea "catamarans" of three or more logs lashed together with rattan, either with or without sails, are still a popular form of vessel, and they are also seen on the Madras coast and throughout the Asiatic islands.

Another curious form of primitive water-craft is the "coracle." This is an open, saucer-shaped vessel, found in many parts of the world, including regions as far remote from each other as the East Indies, Alaska, and parts of Great Britain. The one here shown is of the kind used in the rocky torrents of the East Indian rivers, where it is known as the "parachal."

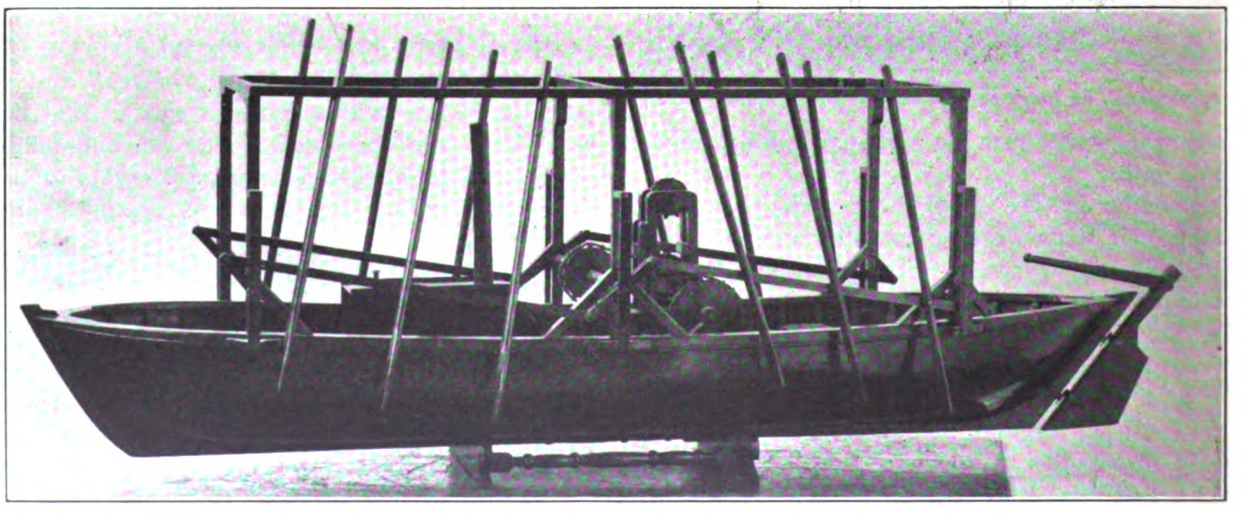
Sailing vessels are of very ancient date, being



A PADDLE WARSHIP OF SIX OX-POWER.
FROM A WOOD-CUT PUBLISHED IN 1560.

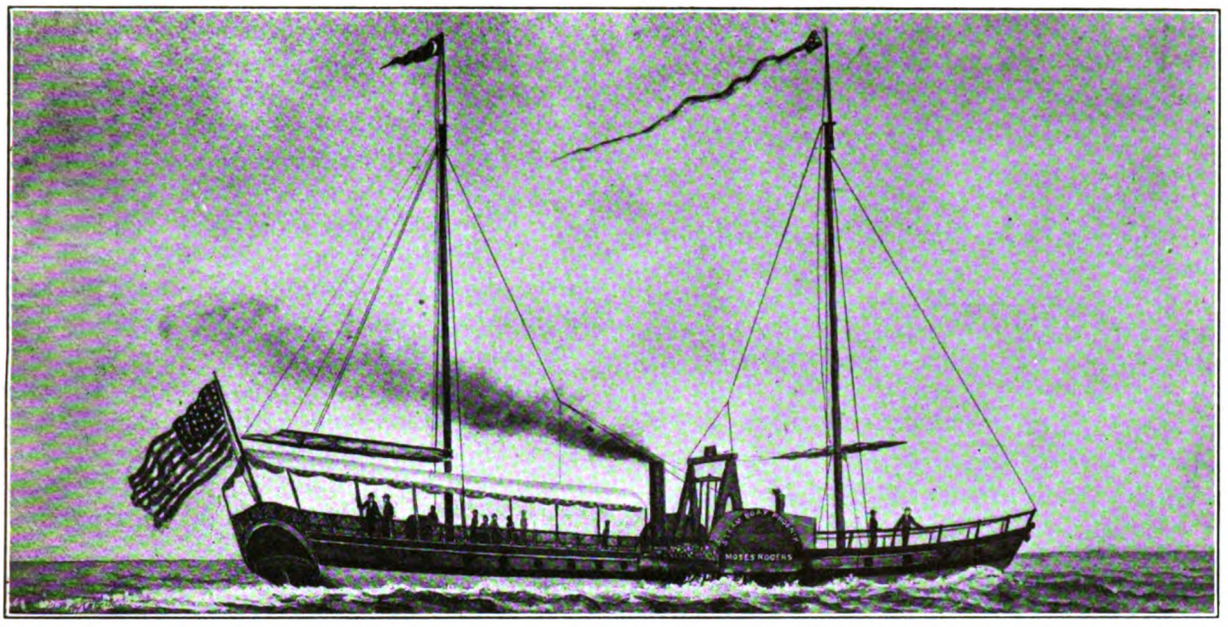
in use among the Egyptians not less than 3000 years ago, as already pointed out. They were not commonly employed at the time, however, but their number gradually increased with the desire to do away with oars as the only means of propulsion. The earliest "rig" was about the same all over the world, consisting usually of one mast set nearly in the center of the keel line, and one square sail. This was the kind of vessel in which St. Paul "suffered shipwreck," and it superseded the long low galleys propelled with oars.

The Saxons, who at one time assumed maritime supremacy in the northern seas, undoubtedly possessed skill in sailing. Their vessels, covered with skins, were made of willow with an oaken keel. It is recorded that in the fifth century three Saxon vessels landed on the southwest coast of England "decked with high forecastle and a quarter-deck." This would indicate a remarkable phase of progress in shipbuilding, and brings us to the time of the first English ships, which were essentially the



John Fitch's first steamboat.

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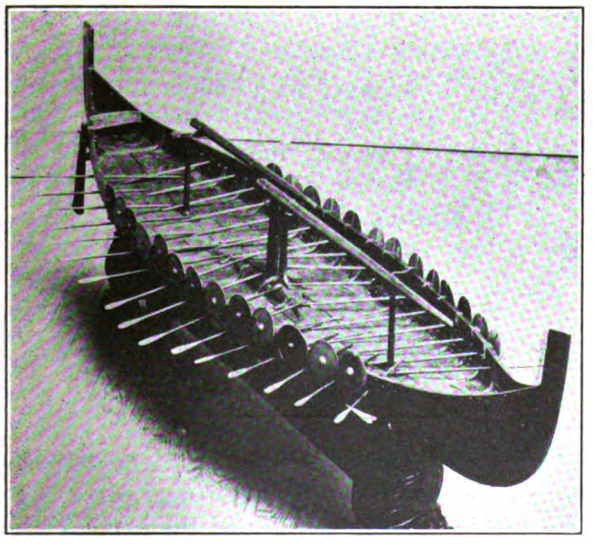


The "Phoenix," built by Captain John Stevens.

same as those of the ancient Greeks and of the Norsemen.

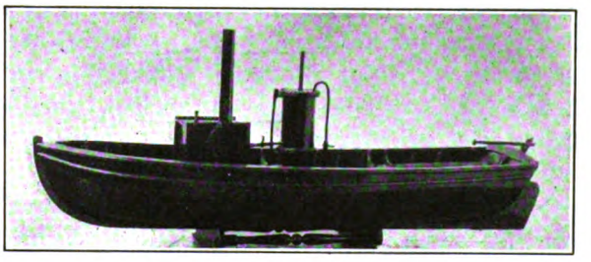
The addition of other masts and sails was the outcome of the desire for greater speed. With the increase of international commerce the advantage of reducing delay to the minimum became apparent, and we of to-day know well how largely all competition in commerce is based on the promptness with which goods can be made and brought to market.

Three-masted vessels began to make their appearance not long after the Christian era. The foremast was not always hoisted, but was raised when the use of the foresail would enable a vessel to escape from attack. Topsails were at that time the distinguishing feature of the Alexandrian ships. The bowsprit mast had a square sail, as also did the mizzen mast. The mainmast also carried a square sail with a triangular topsail above. From these general principles of the Byzantine ship have sprung the many wonderful developments in the seven-masted schooner, or the "Preussen," which has been claimed to be the world's largest sailing-vessel.



A Viking ship, these vessels had splendid under water bodies.

Still greater speed was required due to the keen competition of commercial rivalry, for it had become apparent that fickle winds on which, after all, the fleetest sailing vessel was utterly dependent, would have to be replaced by a stronger and more constant force.



Rumsey's steamboat.

Doubtless with this thought uppermost, John Fitch succeeded in building a steam-propelled boat before the close of the eighteenth century, and it is evident that he had the courage of his convictions, for he wrote this to a friend: "This, sir, whether I bring it to perfection or not, will be the mode of crossing the Atlantic for packets and armed vessels."

About the same time James Rumsey, of Shepherdstown, Virginia, was at work on the construction of a boat "which was to be wrought altogether by steam," and when George Washington saw it launched he is said to have remarked: "The discovery is of vast importance and may be of the greatest usefulness in our inland navigation."

Next in the development along the same lines

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came Steven's twin-screw propeller, 24′ 8″ long, 6′ 1″ beam and 2′ 4⅛″ deep, with an engine of the "high-pressure condensing" kind.

For the successful propulsion of a boat by steam for commercial purposes, however, the honor goes to Robert Fulton, who in 1807 built the "Clermont," which made its first trip from New York to Albany in August, 1807. Then came the "Phœnix," 103′ 3″ long, 16′ wide and 6′ 9″ deep, built by Captain John Stevens and recorded as the first steamboat to "navigate the ocean." Its first trip was from Sandy Hook to Cape May. It was unfortunately wrecked at Trenton, New Jersey, in 1814, six years after its construction.

During the early years of steamboat construction a peculiar form of ferry, known as a "horse-treadmill boat," was invented by John Stevens as a counter move to the exclusive right which Fulton had obtained for navigating the waters of New York by steam. Six horses were employed to revolve a horizontal wheel, which communicated motive power to the paddle-wheel shaft by means of beveled gearing. The boat had two hulls, 90 feet long, placed parallel about 8 feet apart, the space between being decked over. Near the stern were two cabins for passengers, and at the forward end space was assigned for horses and carriages. The monopoly enjoyed by Fulton, however, was declared to be unconstitutional after a few years, and the horse ferry-boats were replaced by steam power. Not altogether unlike this curious style of ferry-boat was an ancient warship propelled by ox power, of which a picture is shown.

In 1819 the first steamboat crossed the Atlantic Ocean. This was the "Savannah," built by Francis Fickett, at Corlear's Hook, N. Y. She was of 350 tons burden, 120′ long, 29′ beam and 13′ 6″ deep. The New York "Mercantile Advertiser" for March 27th of that year contained the following notice: "By an advertisement in this day's paper it will be seen that the new and elegant steam ship 'Savannah' is to leave our harbor to-morrow. Who would have had the courage twenty years ago to predict that in 1819 a ship of 300 tons burden would be built in the port of New York to navigate the Atlantic propelled by steam. Such, however, is the fact. With admiring hundreds have we repeatedly viewed the prodigy, and can also bear witness to the wonderful celerity with which she is moved through the water. On Monday last a trial was made of her speed, and although there was at no time more than an inch of steam upon her, and for the greater part not a half inch, with a strong wind and the tide ahead, she went within a mile of the anchoring ground at Staten Island, and returned to Fly Market wharf in one hour and fifty minutes. When it is considered that she is calculated to bear twenty inches of steam, and that her machinery is entirely new, it must be evident that she will with ease pass any of the steamboats upon our waters. Her cabin is finished in elegant style and is fitted up in the most tasteful manner. There are thirty-two berths, all of which are staterooms. The cabin for ladies is entirely distinct from that intended for gentlemen, and is admirably calculated to afford that retirement which is so rarely found on board of passenger ships."

Odd as the foregoing may sound to modern ears, the following notice of the "Savannah's" first voyage, which appeared in the London "Times," seems utterly ludicrous: "The 'Savannah,' a steam vessel, recently arrived at Liverpool from America —the first vessel of the kind which ever crossed the Atlantic—was chased off the coast of Ireland by the 'Kite,' a revenue cruiser which mistook her for a ship on fire!"

When it is recalled that all this happened less than a century ago, who will dare to prophesy what further developments in ocean travel await the voyager in the year 2000, when possibly what are now conceded as remarkable advances over the performance of the "Savannah" may again by that time have been discarded as obsolete.

LAUNCH OF THE "CASCADAS."

The largest and most powerful dipper dredge in the world was launched from the New York Shipbuilding Company yard at Camden, New Jersey, on June 26th. This dredge is for the U. S. Government, and is for use on the Panama Canal and has been designed for exceptionally heavy work.

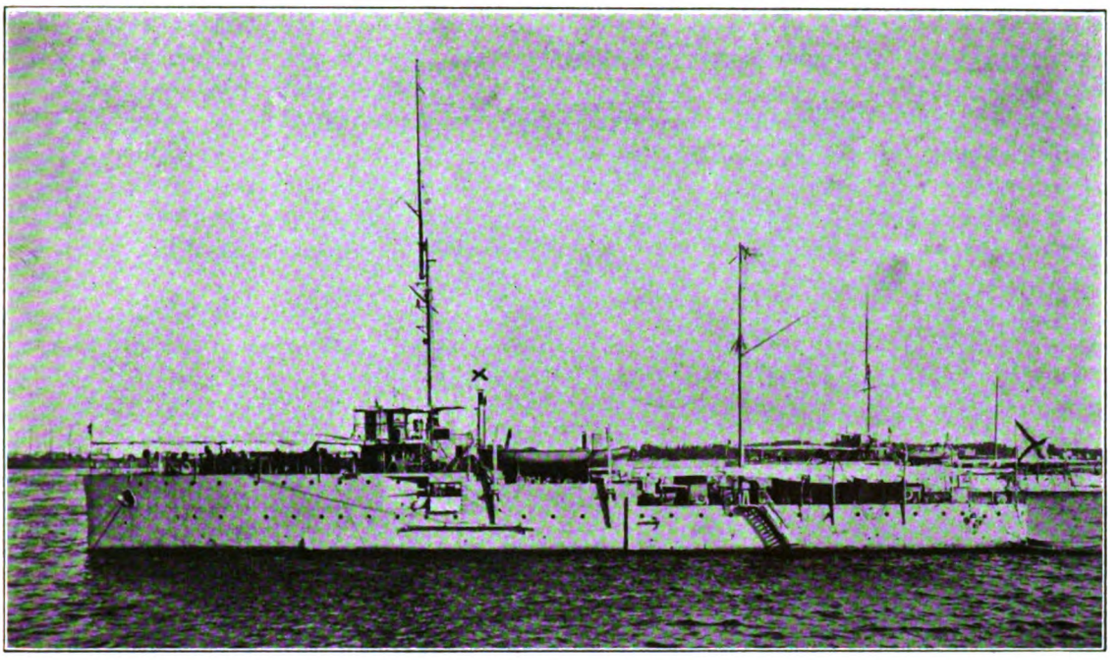
It was designed by the Bucyrus Company of South Milwaukee, Wisconsin, which company also built the machinery for same and the construction of the hull and house was sub-let to the New York Shipbuilding Company.

The dredge is equipped with double tandem compound engines 16″ H.P., 28″ L.P. cylinders and a stroke of 24″. These engines exert a maximum stalling pull on the hoisting rope of 235,000 lbs. This dredge exceeds in size and power any other dredge of the same type previously built.

It will be completely equipped and tested out at the New York Shipbuilding Company yard before being dismantled and towed to the Isthmus of Panama.

It is reported that the New York Shipbuilding Company has secured orders for four more large tank ships on long time delivery, the berths being full at the present time.

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The "Ardagan" and "Kars," two 1000 H.-P. Russian motor gunboats. Each is driven by two 500 B.H.P. Ludwig Nobel-Diesel Oil Engines. These vessels have a speed of fourteen knots and are armed with one 4.7 inch gun, five 12-pounder quick-firers and one torpedo tube.

Some Remarkable Russian Craft

HOW great a part the internal combustion engine is playing in the present European war is well illustrated by the work performed by submarines, vidette boats and by the German, Austrian and British naval volunteer motor-boat fleets, whilst in Belgium motor barges are doing valuable duties as hospital ships.

The ultimate aim of all navies, however, must be to produce a motor-driven battle cruiser, because of the increased cruising range, absence of smoke, and wider gunnery range due to the non-obstruction of smoke-stocks. Several designs have been gotten-out by various European naval authorities, but as yet the question of building engines of sufficient power has offered too many difficulties, although before the war Krupps and the M. A. N. both experimented with sections of an engine for the central shaft of a battleship with encouraging results.

England, Austria, the United States, Holland, Portugal, Germany and Italy all have some medium-sized motor-driven surface naval craft, most of which have Diesel engines installed, but it has been left to Russia to build a fleet of fairly high-powered motor gunboats. Back in 1909 the Standard Motor Construction Co., of Jersey City, N. J., and Lewis Nixon, supplied Russia with ten 600 H. P. gasoline-driven patrol vessels, but on behalf of the Government the firm of Ludwig Nobel, of St. Petersburg, went a step further and engined eight 950-ton, shallow-draught, Diesel-driven, river gunboats, each of 1250 I.H.P.; two 875-ton sea-going gunboats, each of 1250 I.H.P.; one revenue cruiser of 3508 tons, and converted the old cruiser "Ruenda" to Diesel power by installing a 1200 B.H.P. motor equipment. In every case, it is to be noted, the motors are of the four-cycle type, which is of particular interest since many authorities put forward the two-cycle type as being the best for naval purposes.

Regarding the twin-screw Caspian sea gunboats, which as yet, with one exception, are the only successful sea-going motor warships in service, apart from submarines. There are two, and they are of the "Giliak," "Kovietz," "Sivoutch" and "Bohr" class, the latter being four steam-driven gunboats of 875 tons displacement, 12 knots speed, and a complement of 170 officers and men. Bunker capacity 60 tons. Engines, triple expansion 800 I.H.P. The two motor vessels are "Ardagan" and "Kars," and although of the same class are slightly less in displacement, due probably to the saving in machinery weights. But they are of higher horsepower, the latter aggregating 1000 B.H.P. per ship; consequently, they have the increased speed of 14 knots under normal conditions. Doubtless 16 knots could be obtained for a short period if required. Their overall length is about the same as the Amur River craft, with a lesser beam, and greater draught, and their armament consists of one 4.7 gun, and five 12-pdr. Q. F.s. The first of these two was delivered to the Russian Admiralty in 1910, and it was not long before the sister vessel was placed in service.

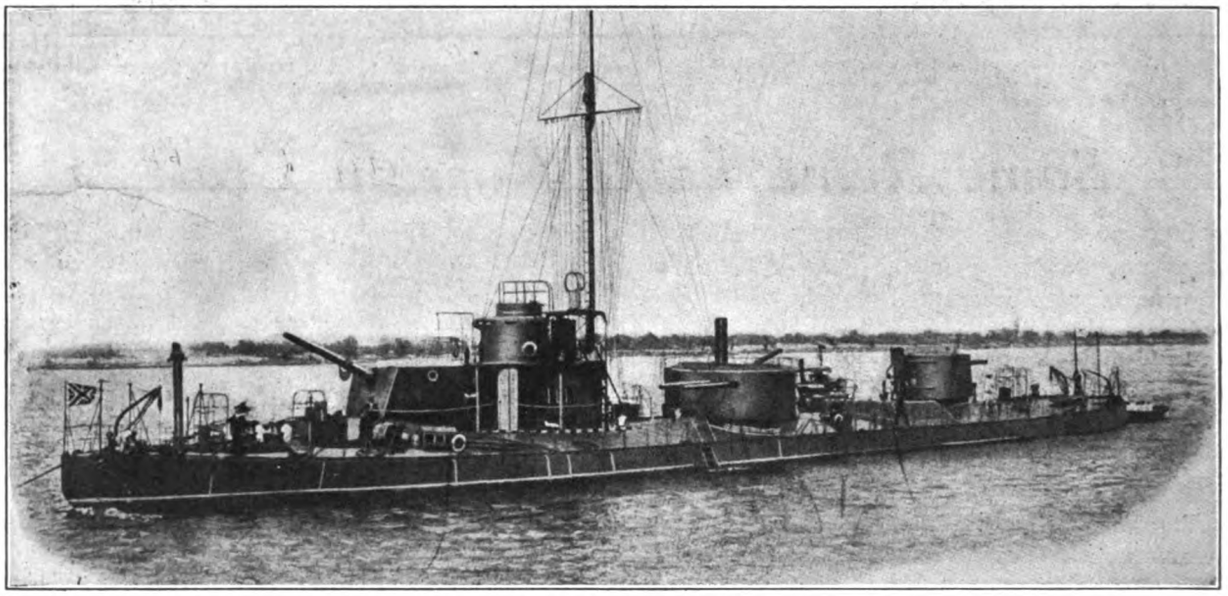
Naturally the principal interest in the "Ardagan" and "Kars" is in their engine-rooms, the installation and arrangement of the one applying to the other.

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The propelling machinery consists of two six-cylinder Ludwig Nobel Diesel-type oil engines, each developing 500 B.H.P. at 310 revs. per minute. Although these engines are reversible, the propellors are driven through Domen-Lablanc pneumatic clutches. Each engine is about 20 feet long overall, by nearly 7 feet high from the center of the crankshaft to the center of the fulcrums of the valve-rockers.

From a marine engineer's point of view the design of this particular model has many commendable features, some of which can more than hold their own with many Diesel engines, constructed in 1915. Chief of these is the arrangement of building each engine practically in two halves, in order that one-half of the engine may be disconnected from the other in case of accident to any cylinder. To allow of this, the camshaft is in two sections with a vertical rod drive at either end of the engine, off the crankshaft. iron crankcase of the enclosed type. The valves, four per cylinder, are all arranged in the cylinder heads and are operated from a crankshaft; on the port, or starboard, side according to the engine. They are the air-starting, atmospheric air inlet, fuel injection, and exhaust valves, respectively, and as before mentioned are actuated by rocker-arms and short push rods from a camshaft, which is in two lengths.

With regard to the eight shallow-draught gunboats, these certainly are most impressive looking craft, and having no super-structure, otherwise than the gun barbettes, they make very difficult targets to hit. It is not at all improbable that the future motor-driven battle cruiser will resemble them in appearance. There are also five steam-driven craft of somewhat similar design. Four of the motor-vessels are named "Schkwl," "Smertch," "Graza" and



A 1000 H.-P shallow draft motor gunboat belonging to the Russian Imperial Navy, one of four in service on the Amur river, Siberia. This vessel is driven by four 250 H.-P. Nobel-Diesel engines, through electrical transmission, there being four screws. The craft is 233 feet long, 42 feet 4 in. beam and is armed with two 6-inch and four 12-pounder guns.

Another noteworthy feature is the system of driving the air-compressors at the back of the engine by beam levers, off the connecting rods, this dispensing with separate compressing auxiliary plant. This arrangement is also adopted with the Werkspoor-Diesel engine. It will be remembered that the motor-ship "Selandia" had two 200 B.H.P. auxiliary compressor equipments, in addition to an oil-fired steam-driven set. The only auxiliaries aboard the "Ardagan" and "Kars" are two 65 H.P. electric lighting sets. Yet another feature is the short push-rods actuating the valve rods, which are worthy of special notice, as the expansion and contraction with the temperature of long rods are liable to vary the opening of the fuel injection valves, the adjustment of which is delicate.

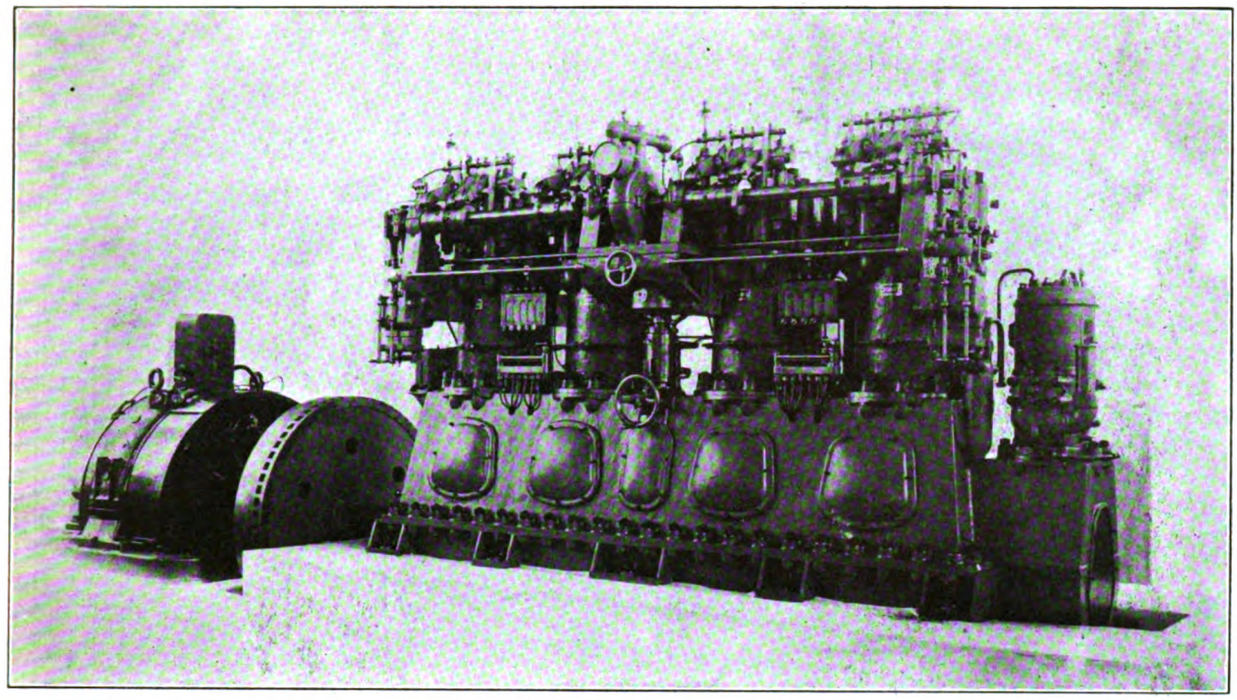
There are six cylinders to each "Ardagan" engine, arranged in sets of three, and mounted on a cast

"Schtorm," but the names of the others are not available.

The "Schkwl" was put into commission in 1909, whilst the other three were in service in 1910. The remainder followed later.

They are quadruple-screw boats, 233 feet in length, by 42 feet 4 inch beam, with not over 6 feet draught. Seeing that they do not stand more than 10 feet out of the water, excepting the barbettes, conning tower, and masts, it will be realized that they are peculiar looking craft, and different in every respect from the "Ardagan" and "Kars." Constructed of heavy steel, with barrel decks, the upper work consists of five barbettes, one mast with wireless installation, two short and slender exhaust funnels, and boat davits fore and aft. The second barbette from the bow is extended upwards, forming the conning tower and bridge, which carries a powerful searchlight.

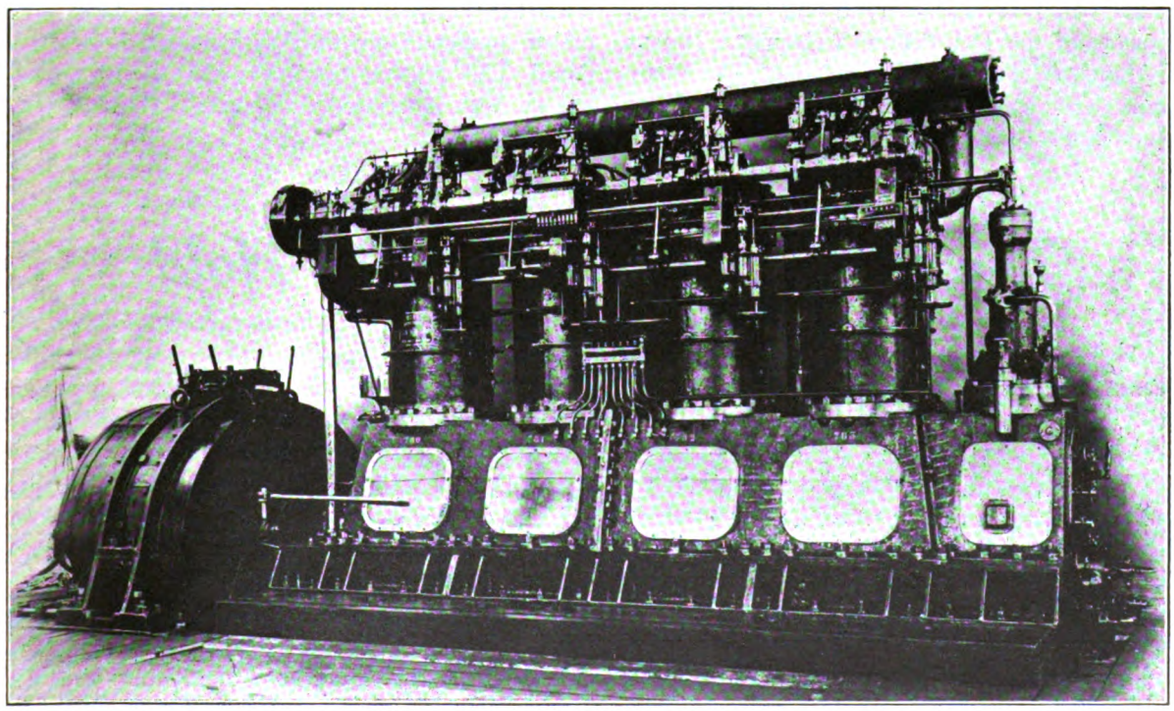
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One of the four 250 H.-P. Nobel-Diesel non-reversible engines of the Amur river gunboats, showing the Del-Proposto electrical transmission element.

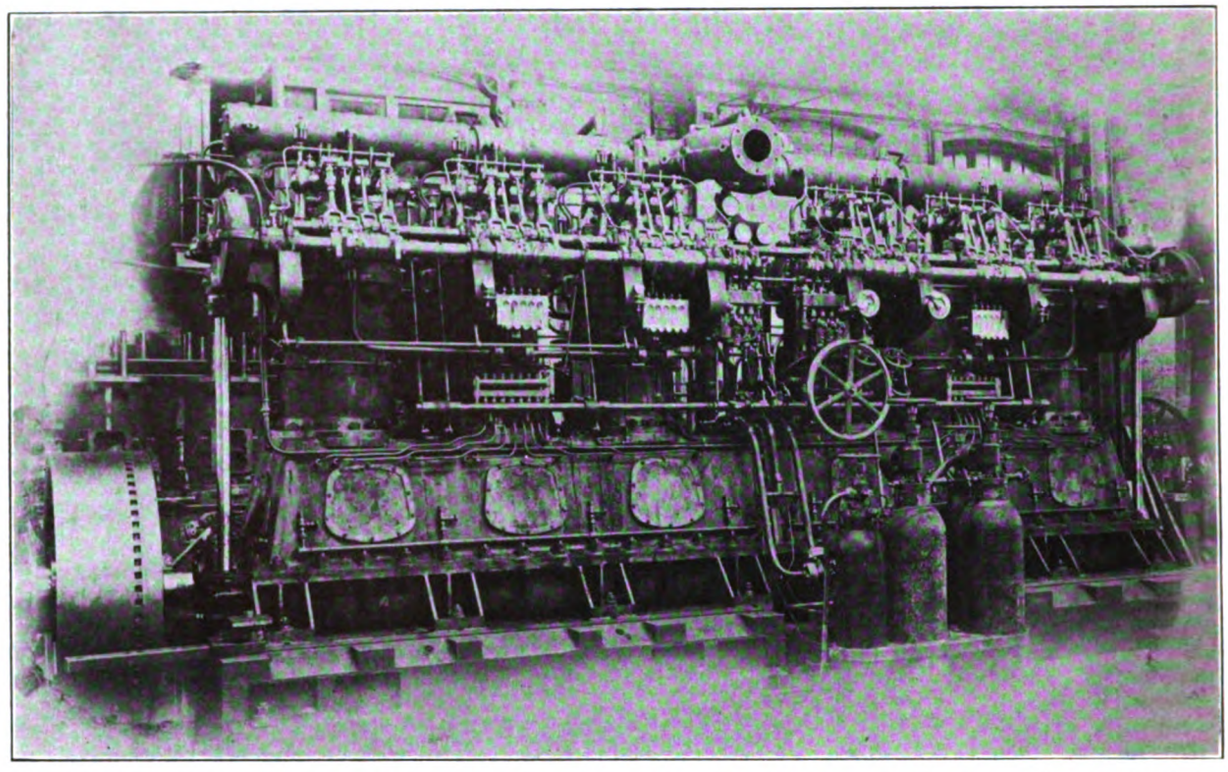
The armament consists of two 6-inch guns and four 12-pdr. quick-firers for each ship.

The propelling machinery consists of four Ludwig Nobel Diesel-type oil engines, each developing 250 B.H.P. at 350 revs. per minute, and driving its screw through a Del Proposto electric transmission gear, which gives the necessary flexibility, unobtainable from the *early* Diesel engines The engines are of the four-cycle non-reversible class, each with four cylinders, 13-inch bore, by 15-inch stroke. In each cylinder head are fitted three valves, namely, an inlet, fuel injection, and exhaust; starting evidently being by the Del Proposto motor, deriving the current from storage batteries. The valves are operated by rockers from a camshaft on the starboard side, which in turn is actuated by skew gearing from a vertical shaft driven off the crank shaft between the two central pairs of cylinders. The compressor for fuel injection air is driven directly off the crankshaft at the forward end of the engine. Fuel is forced to



One of the two 600 B.H.P. Nobel-Diesel engines with electrical transmission, installed in the old Russian 3000-ton cruiser "Ruenda" as an experiment. Both engines had to make a five-day non-stop run before being taken over.

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One of the six-cylinder, 500 B.H.P., reversible Diesel-type oil engines constructed by the Machinenfabrik Ludwig Nobel for the Russian gunboats "Ardagan" and "Kars."

the injection-valves by plunger-pumps operated by eccentrics at the after end of the camshaft. Lubrication is by force-feed, a sight-feed lubricating box being arranged between the fore and aft pairs of cylinders; there are seven drips from each lubricator, pipes being led to the various working parts. The crank case is of the enclosed type; but there are five large doors on either side. These particular engines, not being reversible, reversing was carried out by means of the Del Proposto element. It was not long, however, before Ludwig Nobel, like many other firms, was able to reverse the high-powered motors, and later boats have reversible engines. In fact, it is interesting to learn the first Nobel reversible marine oil engine was built some eight years ago. The experiences of the Maschinenfabrik Ludwig Nobel are of no mean nature, as they have been constructing Diesels for 16 years, during which time they have built about 60,000 H.P. for marine purposes alone, apart from stationary engines. This must have been considerably increased of late because of very large naval orders completed.

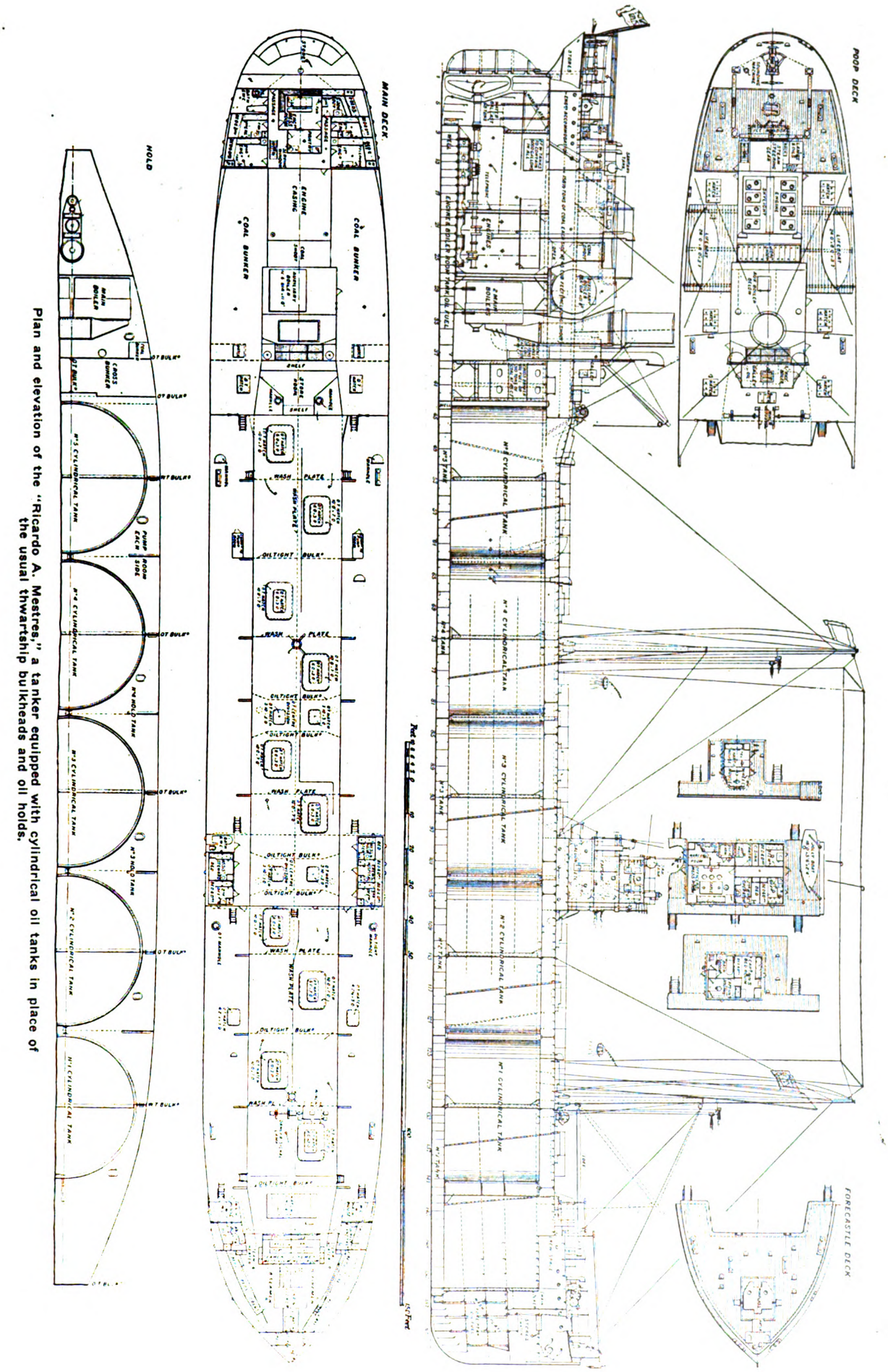
Last year the Dutch Government took over a motor gunboat from the Werkspoor Co., of Amsterdam. This was a vessel of 1200 B.H.P., and the engine was illustrated in PACIFIC MARINE REVIEW for June.

The Oil Tank vs. the Oil Hold

DURING the last year or two several oil carriers have been built with large cylindrical tanks instead of the usual thwartship bulkheads as a means of subdividing the cargo space. This system has been evolved by Mr. C. P. M. Jack of New York and London and has attracted considerable attention. The natural advantage that at once suggests itself is the ease with which these cylindrical tanks can be cleaned out. There is, of course, no stiffening on the tank walls on the inside, the inner bottom tank top forms the floor of these cylinders and the deck and expansion trunk form the covers.

The "Ricardo A. Mestres," a plan of which is shown herewith, was constructed for the Transcontinental Petroleum Company and was built by William Gray and Company, West Hartlepool. This vessel has a length between perpendiculars of 365 ft., a breadth extreme of 50 ft. 9 in., and molded of 50 ft. 6½ in., while the depth molded is 29 ft. 3 in. She is built with a double bottom extending throughout the full length of the ship, with the usual fore peak, in which oil fuel may be carried in supplement to the oil fuel in the athwartship bunker immediately in front of the boiler compartment, which, with the engine-room, is placed in the after part of the ship. There are five tanks for the carrying of heavy oil. The forward tank

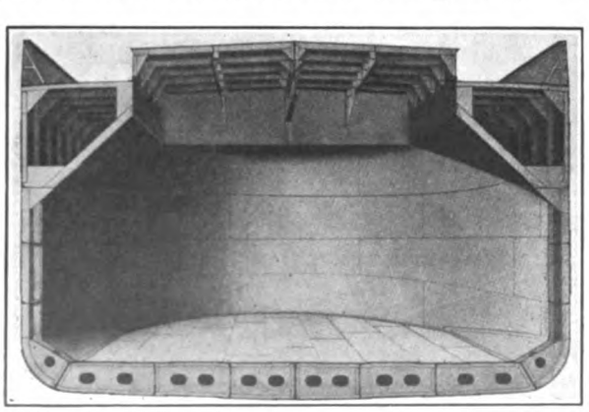
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Plan and elevation of the "Ricardo A. Mestres," a tanker equipped with cylindrical oil tanks in place of the usual thwartship bulkheads and oil holds.

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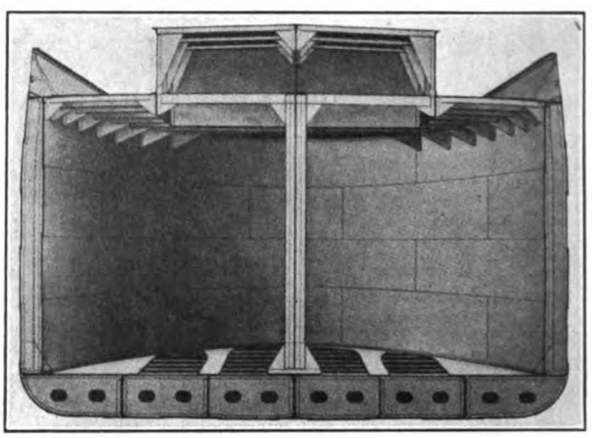
has a capacity of 32,850 cu. ft., the other four of 38,025 cu. ft. each; the hold-tanks, at the side of and between the cylindrical tanks, numbered 3 and 4, on the port as well as the starboard side, are of a capacity, in all four cases, of 10,642 cu. ft. In addition, oil may be carried in the five double-bottom tanks, as marked on the longitudinal section; and these, including the accommodation of the expansion trunks formed in connection with the decks, make the total capacity of the cargo spaces up to 285,793 cu. ft. Excluding the expansion trunks, the total capacity is 263,968 cu. ft. In addition, there is bunker capacity of 26,183 cu. ft. The interesting feature consists in the construction details of the cylindrical tanks. The midship section through one of the tanks, is built up of shell-plating secured to the tank top and deck by strong angles. It will be seen from the plans that the cylinders are connected to each other at the center line by fore-and-aft oil-tight vertical webs, and that a combination of web-frames, beam-plating, and built stanchions, outside and between the cylinders, provides an oil-tight division in the expansion-trunk, as well as transverse strength for the ship. At the center of each cylinder there is a transverse oil-tight division between it and the ship's side. This is continued inside in a fashion which may be described as a bulkhead, having two large square holes in it, thus forming a strong transverse construction. The tanks are air-jacketed, which enables the temperatures of heavy oils to be more easily raised. It is claimed for this system of construction that every rivet in the cylinder is under shear; that the unstiffened sides of a cylinder can withstand very great pressure; that semi-circular forms of bulkheads do not require any stiffening and most efficiently tie the deck and bottom of a single-deck ship together; and that there are no center line bulkheads required in a cylindrically tanked ship. Notwithstanding the fact that rectangular tanked ships utilize the vessel's side as a part of the tank walls, there is very little difference in the number of square feet of bulkheading forming the oil retainers and the advantage in weight of bulkheads is with the cylindrical arrangement. The



The cylindrical tank construction in a 'tween-decks ship.

cylindrical tanker, as designed for heavy oils, will carry her entire deadweight in the tanks and trunkways. No part of the hull proper has therefore to be oil riveted.

In the "Ricardo A. Mestres," the space between number four and number five tank on each side



The cylindrical tank as applied to a single decker.

is utilized as a pump-room and from here connection is made with all the tanks, both for oil and pumping water ballast. The pumps have a capacity of 500 tons per hour. The vessel is a single screw boat with engine far aft. The engine is triple expansion with cylinders 25, 41 and 68 inches in diameter and a stroke of 48 inches. Steam is supplied by three large Scotch boilers set in one fire-room athwartships and working at 180 pounds and burning either coal or oil. The donkey boiler is on the main deck immediately above the main boilers and is of the Scotch type 12′-6″ long by 11′-0″ diameter.

The East Asiatic Company is having a large four-masted sailing ship named the "Kobenhaven" constructed at Leith. This vessel will be 370′ long between perpendiculars, 52′ beam by 29′ 6″ molded depth. The auxiliary machinery will consist of a six-cylinder, four-cycle Diesel engine of the Burmeister and Wain type with enough power to drive the vessel seven or eight knots.

The Newport News Shipbuilding and Dry Dock Company on June 19th launched the steamer "Walter D. Noyes," built to the order of the Crowell & Thurlow Company of Boston. This steamer is a sister ship of the "Edward D. Pierce" and is 375′ by 49′ by 30′ in size with a deadweight capacity of 7000 tons. Before her keel was laid the "Walter D. Noyes" was chartered for five years to carry coal to New England ports.

The William Cramp & Sons Ship and Engine Works expect to deliver H. P. Whitney's big turbine driven yacht about the 15th of the present month.

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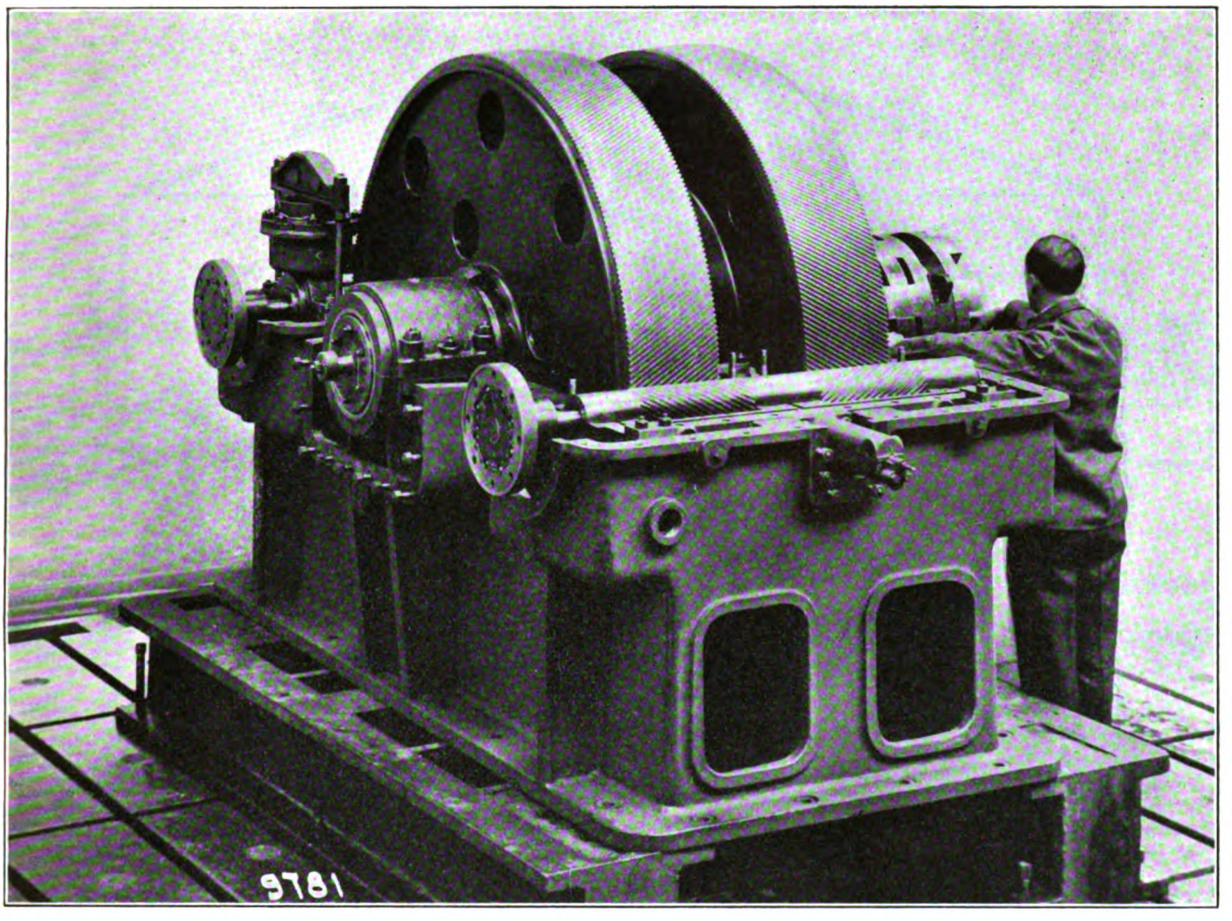


Fig. 5.—General view illustrating size and appearance of the gears.

Cruising Gears for "Pennsylvania"

THE general features of the machinery for the U. S. Battleship "Pennsylvania" have been briefly discussed in the engineering press. Now that the cruising gears have been built, some additional information regarding their construction will be of more than passing interest.

The "Pennsylvania" has four shafts and propellers. Each inboard shaft is driven by a high pressure turbine placed in the forward engine room and has an independent backing turbine located in an engine room immediately aft of the forward one.

Each outboard shaft is connected to two cruising turbines located in the forward engine room and also to the main low pressure turbine, with its ahead and astern elements, placed in the after engine room.

At cruising speeds steam from one cruising turbine passes to the other cruising turbine, then to the main high pressure turbine driving the inboard shaft and finally to the main low pressure turbine on the outboard shaft.

At high speed both of the cruising turbines are disengaged and the steam enters the main high pressure turbine and passes directly to the main low pressure turbine.

This arrangement of propelling machinery, while adding to the number of units, has a distinct advantage in steam consumption over the earlier systems in which the main turbines are used for cruising purposes.

As about ninety per cent of the total voyages of a battleship are made at cruising speed, the importance of obtaining the highest possible economy at this speed is apparent.

In order to get this better economy, the two high speed cruising turbines are connected to the outboard propeller through the medium of a two-pinion Westinghouse hydraulic floating frame reduction gear. The details of these gears are clearly shown by end elevation, Fig. 1, plan view, Fig. 2, and side elevation, Fig. 3. The clutch coupling on the main gear shaft serves to disconnect the cruising turbines when the vessel is traveling at full speed.

The general construction is the same as used on all high speed, high power gears built by the Westinghouse Company. The distinctive feature of these gears being the use of the floating frame which insures uniform tooth pressures under all load conditions. The practical value of the floating frame has been thoroughly demonstrated, some

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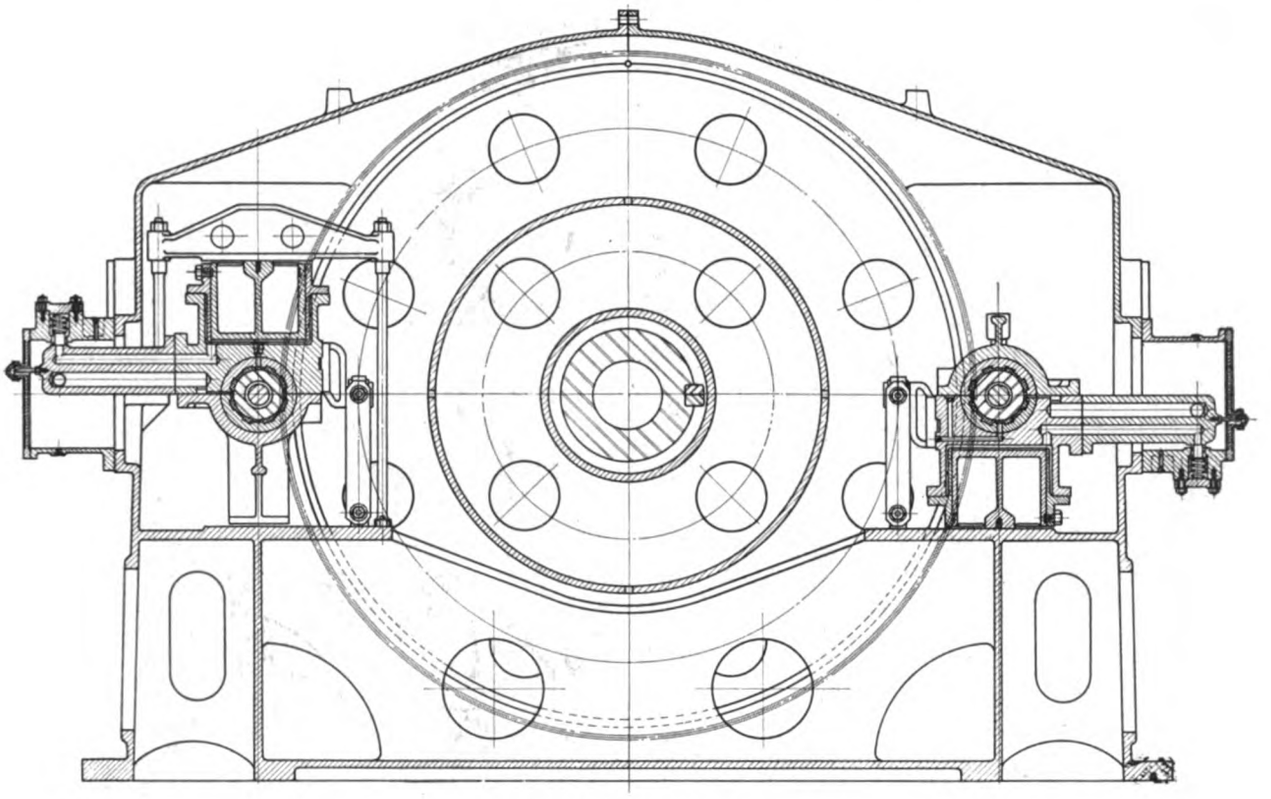


Fig. 1.—End elevation.

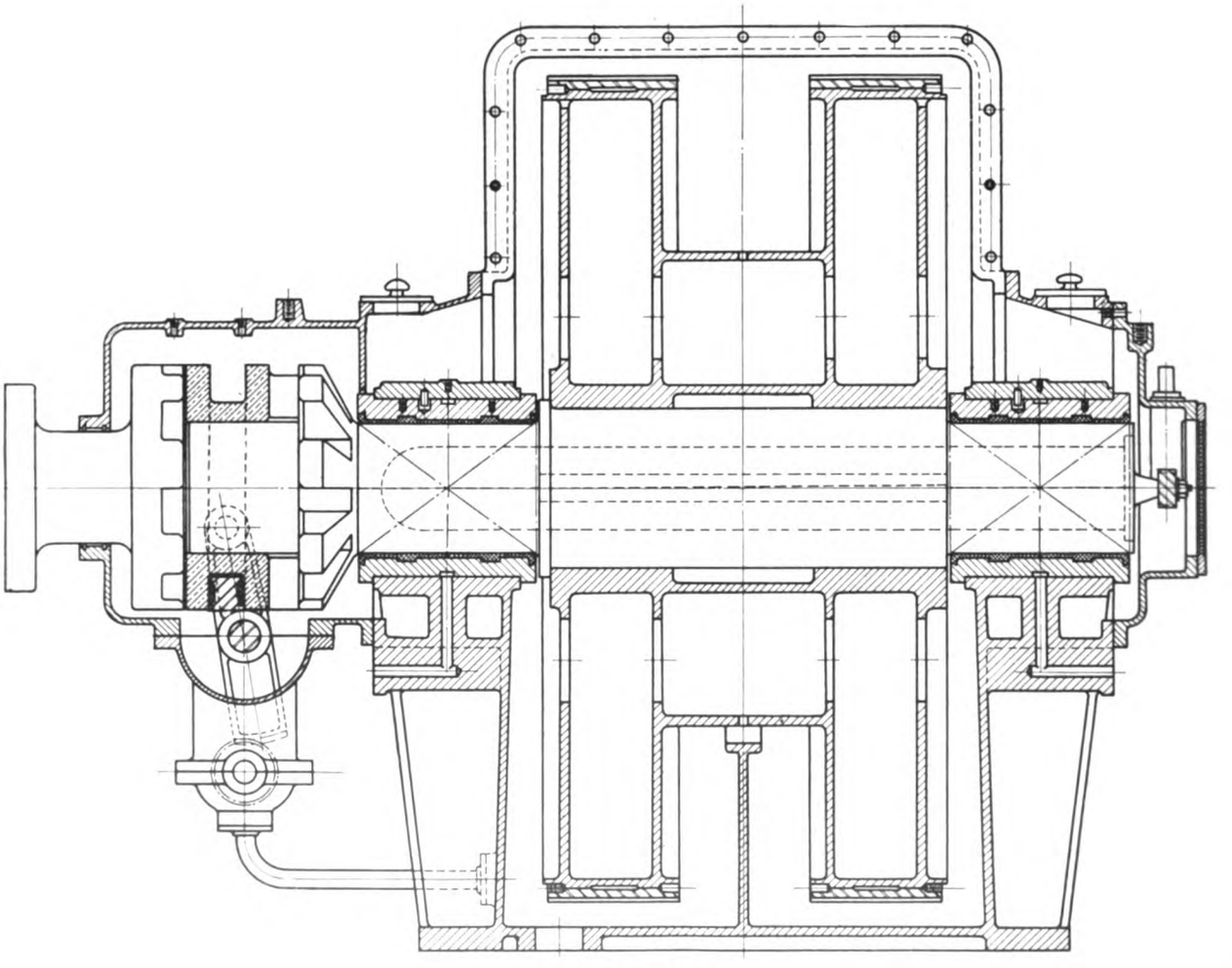


Fig. 3.—Side elevation.

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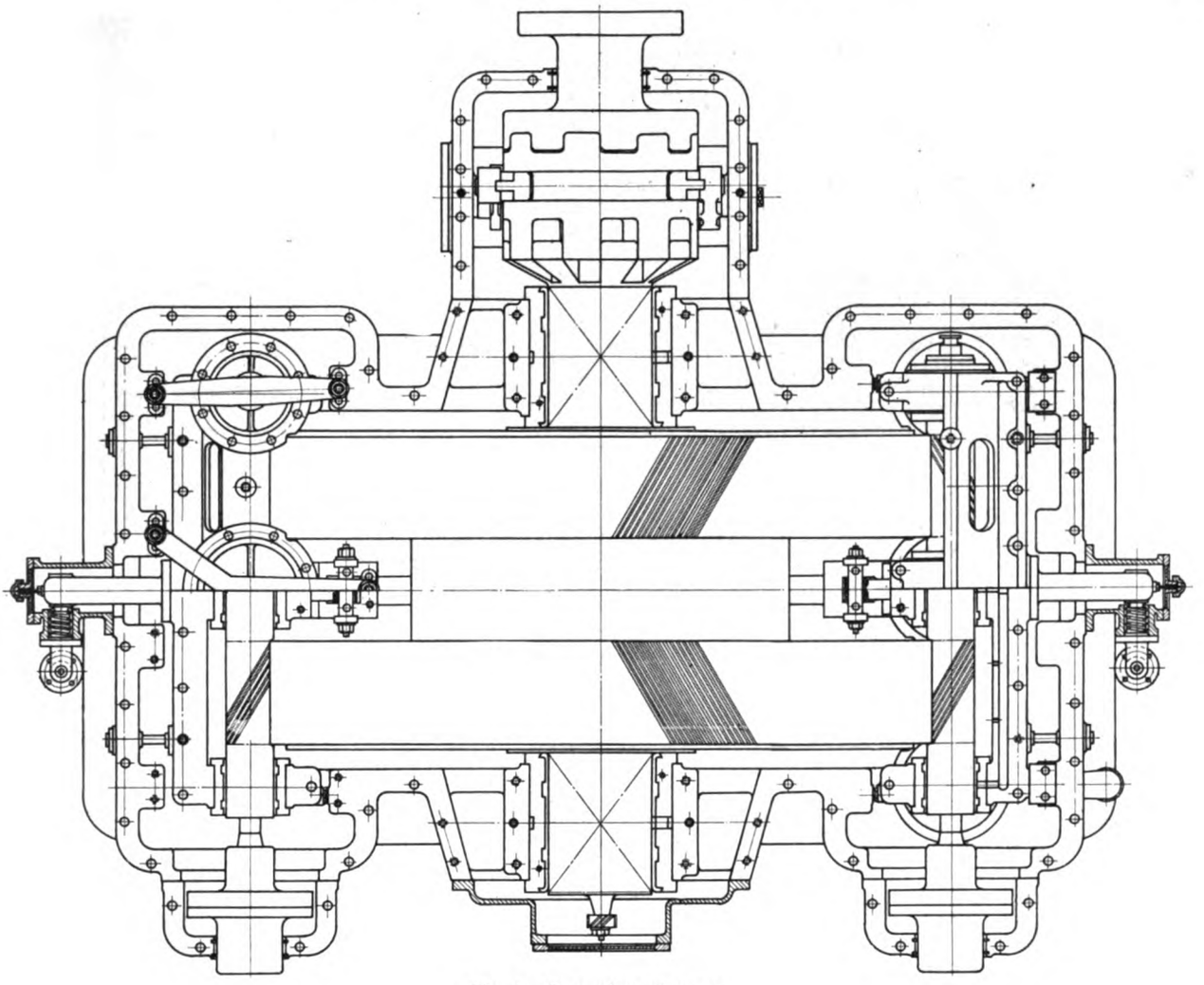


Fig. 2.—Plan view of gears.

of the first gears built having been in continuous service over four years. The teeth of these gears show no wear that can be detected and the uniformity of the pressure distribution is very marked, as the whole length of the gear tooth face is well polished.

An additional advantage gained by using the floating frame is the ease with which the horsepower transmitted may be determined. Experience has shown that in a high speed bearing, such as employed here, the oil pressure developed by the bearing is directly proportional to the power transmitted. It is only necessary, therefore, to connect the oil pipes from the floating frame to a pressure gage and obtain the speed by means of a suitable tachometer. Obviously, both of these instruments may be of the recording type, so a continuous record of the shaft horse-power developed may be obtained.

Calibration curves for these particular gears are shown by Fig. 4. The difference in oil pressures on the inboard and outboard frames is due to the fact that in one case the floating frame is above and in the other below the pinion bearings. Supposing the oil pressure on the inboard side is sixty pounds and on the outboard side forty pounds. From the calibration curves it will be seen that the corresponding values of "W" are 415 and 367 respectively. Multiplying the sum of these or 782 by r.p.m. of gear wheel and by the constant 0.0118 the shaft horsepower is readily obtained.

The general construction of these gears and their size is clearly shown by Fig. 5. Each gear is designed to transmit sixteen hundred S. H. P., with a speed reduction from eighteen hundred to one hundred twenty r.p.m. The weight of each gear exclusive of the clutch is twenty-three thousand pounds.

Up to June 19, 1915, under the Act of August 18, 1914, permitting American owned foreign built vessels to take out American registry, 150 vessels of 528,912 gross tons have taken either permanent or temporary American registry. There has been a disposition in many quarters to crow over this "left handed" growth of the American Foreign Trade merchant marine, but in reality the amount of shipping enumerated above is pathetically small when one considers the remarkable incentive that has existed during the past nine months for foreign ships to take out American registry.

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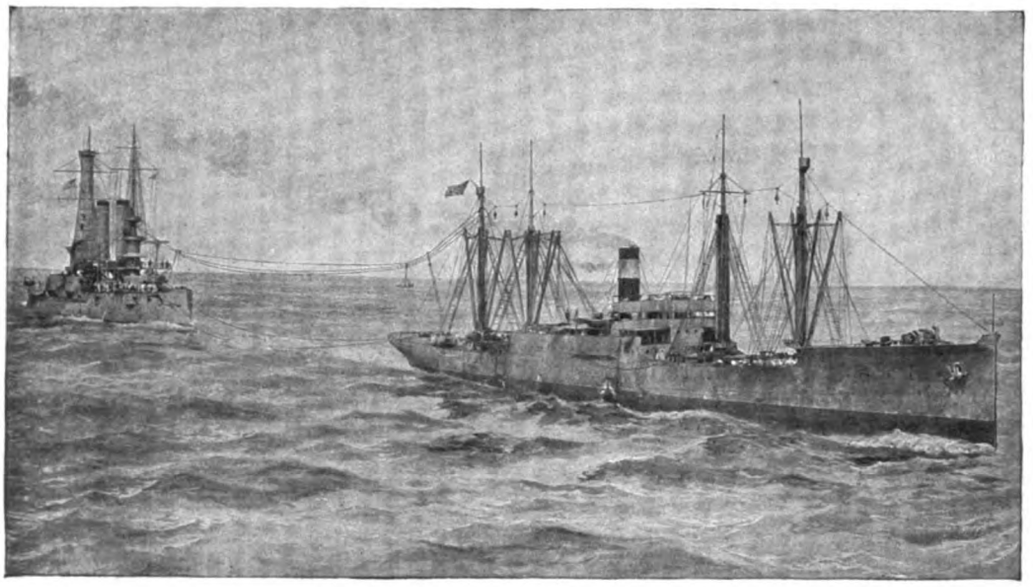


Fig. 3.—Preliminary test. U. S. S. "Iowa" coaling from U. S. Collier "Vestal."

Refueling Warships at Sea

By Spencer Miller, Esq.

Résumé of a paper delivered by Spencer Miller before the December, 1914 meeting of the Society of Naval Architects and Marine Engineers.

THE coaling of warships at sea with the purpose of maintaining the efficiency of blockades and extending the radius of action of vessels employed as commerce destroyers has undoubtedly been one of the most interesting problems in relation to keeping a large English fleet in service on the North Sea and coaling at sea was even more vital to the handful of German commerce destroyers which caused so much damage before being finally rounded up. War conditions between great European powers has led to a thorough demonstration of the few methods of sea coaling now in use and Mr. Miller's paper is of peculiar interest at this time.

After detailing the experience of navies in some blockades and pointing out the loss in efficiency due to the absence of a portion of the fleet for the purpose of recoaling, the author deals with the collier question as follows:

The bigger the collier and the better the broadside coaling gear the oftener it can be used for broadside coaling under headway in smooth seas. Furthermore, the bigger the collier the steadier it is for handling coal along the decks when delivering coal in a heavy seaway. It must be understood, however, that any collier can be equipped with a marine cableway for coaling in a seaway.

The British Admiralty experimented for years to find or develop a suitable sea-coaling apparatus to be wholly carried by battleships and cruisers. None appreciate the value of refueling warships in a seaway more than the British Admiralty. They have mastered the art of oil bunkering at sea, but the apparatus is carried on their own oil tank ships. The British Admiralty has never built a fleet of naval colliers. Colliers carrying coal to British warships are privately owned and are chartered, as needed, by the Admiralty. The author has never heard of any privately owned collier being equipped with coaling-at-sea apparatus, except experimentally.

It is for these reasons that the author believes that the cruisers in the North Sea are coaling chiefly at shore bases or at sea when sea conditions permit colliers to come alongside. The efficiency of the patrolling fleet must be low in rough weather.

An extraordinary demonstration of sea power is exhibited by Great Britain placing fast cruisers to protect English shipping on the Atlantic Ocean. Several British cruisers are protecting the lanes of travel between Great Britain and the United States. These cruisers could coal on the British coast, at Halifax and at Bermuda. Halifax is about 200 miles distant from the popular transatlantic routes and Bermuda nearly 600 miles.

It is always important that bunkers be kept as full of coal as possible. Many of these ships coaled at Halifax. When one of these cruisers leaves the lane of travel it becomes temporarily useless for the purpose assigned. To steam 200 miles, coal and return, would consume the better part of three days and is time lost. The trip halfway across the Atlantic and back at economical speed would be about nine days. Assuming that three days out of twelve be lost in coaling, the efficiency of such a ship would be about 75 per cent.

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Generally speaking, therefore, it appears that the efficiency of such a fleet of commerce-protecting cruisers would be greatly enhanced when served by colliers capable of delivering coal in a seaway. In time we may learn that these cruisers did coal near the American coast from colliers alongside when the sea was smooth enough to permit.

The year 1914 witnessed the triumph of the submarine and the automobile torpedo. It has already been demonstrated in English maneuvers that the submarine finds its victims by lying in wait in the vicinity of the known coaling ports of the enemy. The author believes that when all the circumstances connected with the sinking of the British ships in the North Sea come to light it will be found that some of these vessels were sunk either on their way to or from their coaling base. The triumph of the submarine seems to indicate that the safe place for refueling is on the high seas.

Where submarines are present it is necessary for warship and collier to steam ahead continuously at not less than 10 knots. This adds enormously to the difficulties of coaling broadside at sea. It makes it impossible to coal from small boats at sea. Recognized defense against submarines is not only speed but a continuous change in direction. This again adds to the difficulties of broadside coaling, for even though a sea might permit two ships to steam alongside at 10 knots, if steaming head-on into a sea, they might not do so in the trough of the sea. All of this is permissible in connection with any practicable cableway system of coaling at sea.

Sir Percy Scott regards battleships obsolete because of the perfection of the submarine and the automobile torpedo. No navy has ceased to build battleships. Naval constructors everywhere are endeavoring to determine the most practicable way of constructing a battleship with defensive qualities against the torpedo. The ordinary double bottom is no longer sufficient protection against the torpedo. The plan which apparently presents the most practicable advances is complete underwater armor. It will be a serious matter for a battleship to carry the weight of the necessary extra armor unless the bunker capacity of the battleship is largely curtailed. To largely curtail the bunker capacity of a battleship is a matter of serious moment unless the art of refueling at sea is mastered.

Coaling the U. S. S. "Wyoming" in 1914.

The U. S. S. "Wyoming" coaled at Guantanamo Bay in the spring of 1914 from the U. S. collier "Jason" on one side and the U. S. collier "Nereus" on the other. Both colliers are equipped with the two most recent types of coal-discharging apparatus. Both discharge with clamshell buckets.

The "Jason" is equipped with twelve marine transfers, each operated by one winchman.

The "Nereus" is equipped with twelve special cableways, each operated by two winchmen.

Both colliers rigged out eight booms over the deck of the "Wyoming."

The "Jason" used her eight booms continuously, dropping coal at eight different points along the deck and through the chutes of the "Wyoming."

The "Nereus" used six to eight booms, intermittently, on account of breakages.

All was made ready for test the night before—time to get ready not given (usually 20 to 30 minutes' work on the "Jason"). Coaling began at 5:30

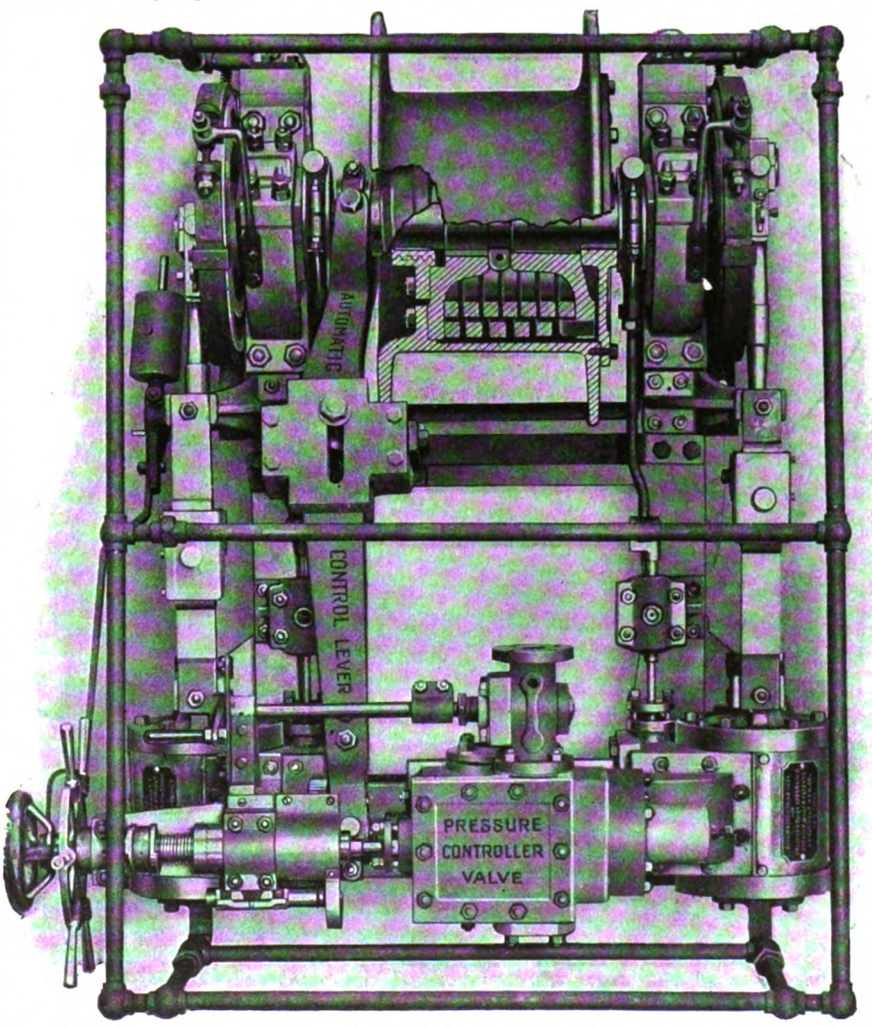


Fig. 11.—Cross section of spring drum of small automatic tension engine showing lever connections between drum and pressure controller valve. This machine is used in connection with breeches buoy apparatus for life saving at sea.

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in the morning and stopped at 8 o'clock for breakfast, resuming at 8:30. The "Jason" cast off at 9 o'clock. The "Nereus" cast off at 9:30 o'clock. The "Jason" delivered to the "Wyoming" a maximum of 465 tons per hour. The "Nereus" delivered to the "Wyoming" a maximum of 433 tons per hour. The "Jason" delievered a total of 1,040 tons in 3 working hours, an average of 346 tons per hour. The "Nereus" delivered a total of 1,020 tons in 3½ working hours, an average of 292 tons per hour.

From 550 to 600 tons of coal were heaped on board when the colliers left, and it required from 9 o'clock in the morning to 4:30 in the afternoon to clear up and stow the coal left on board.

The whole operation of taking on and stowing 2,060 tons of coal was accomplished in 9½ hours, an average of 217 tons per hour.

Both the "Jason" and the "Nereus" coaling gears are able easily to discharge 100 tons of coal per hatch per hour.

In the official trial of the collier "Jason" 137½ tons of coal were actually discharged in one hour with one operator.

At the conclusion of the trial Admiral Badger expressed the opinion that the "Wyoming" could at any time take on 2,100 tons of coal in five hours from two colliers in smooth waters, stowing the surplus left on deck at leisure.

From the above it appears that from one collier the taking on and stowing of 2,100 tons of coal would require approximately ten hours, being an average of 210 tons per hour. The coaling rate in 1914 is therefore seven times faster than in 1893.

So far as colliers and coal-discharging gear are concerned, their development has outstripped the stowing facilities on battleships. In the author's paper, "Coaling Warships from Colliers in Harbors," read before this Society in 1910, he pointed to the record of discharging, with the marine transfer, 190 tons of coal from one hatch of the collier "Hector" in one hour with two operators.

He also stated that in future marine transfers, capacity was to be sacrificed in the interest of economy of maintenance and operation, the new winches to be more rugged, as fool-proof as possible, and the control simplified so that each marine transfer could be operated by one winchman. It is gratifying to note that on the colliers "Neptune," "Orion" and "Jason" all the conditions set forth at that time have materialized. It is unnecessary to have a discharging apparatus with a capacity greater than 100 tons an hour per hatch. It is wasteful of money to use more winchmen than are necessary.

The official test of the marine cableway on the U. S. collier "Cyclops" used in coaling the U. S. S. "South Carolina" took place on April 12, 1913.

The contract of the Navy Department called for a delivery of 480 tons of coal in a period of eight hours. The cableway was operated for six hours under most unfavorable conditions of sea and weather and was stopped because of darkness. After the trial was started a driving rainstorm developed and continued throughout the afternoon of the test. The cableway was set up, and the automatic tension engines performed their functions for six consecutive hours and coal was transported for four hours.

Details of the Sea Trial.

10:48 a. m.—Buoy was dropped from the collier.

10:50 a.m.—Buoy was picked up by the battleship.

11:00 a. m.—The two tow-lines were made fast.

Thus 12 minutes were required to pass and make fast the tow-lines.

11:05 a.m.—The main cable had been passed over and made fast.

This showed that it required only 5 minutes to set up the main cable.

11:09 a. m.—The tail block was made fast.

11:12 a. m.—All gear was made fast on the battleship.

This indicated that after the tow-lines were passed only 12 minutes are required to set up the entire apparatus.

11:19 a. m.—The marine cableway was entirely set up and ready to operate.

Thus only 19 minutes were required to set up the marine cableway after one ship had taken the other in tow.

Coaling was postponed until after dinner, was begun at 12:45 p. m. and continued until stopped by darkness.

During the trials no one was hurt, no bags were lost overboard, nothing was carried away, no damage was caused to anything, and no stops were made for adjustment excepting the block on the lowering device on the battleship.

A large part of the time the collier rolled 20 degrees.

During the last hour 83 tons of coal were delivered in 52 loads, and in that hour, because of lack of organization on the battleship, the load carriage was held at the battleship end for the return of empty bags a total of 9½ minutes, clearly indicating that if the empty bags were returned promptly 60 loads would have been dropped in one hour. Many loads were dropped with only 50 seconds' interval.

When naval officers and seamen become familiar with the operation of the marine cableway, especially if they have had a few hours' drill, the capacity of the marine cableway will be materially increased. A great deal depends upon the efficient work at the warship terminal in taking away the loaded bags from the platform and the hooking on of the empty bags without delay to the traveling carriage.

Drill and practice of only a few hours on the

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collier, at the loading station, will also materially increase the capacity of the cableway.

Naval officers witnessing this test freely expressed the opinion that with drill and practice the cableway was equal to transporting 100 tons of coal per hour.

The cableway made 200 trips and delivered 312 tons, showing that the load averaged 3,495 pounds.

With the prompt return of empty bags the cableway will make 60 trips per hour. If each bag had carried an average of 50 pounds more coal, the result would have been 100 tons per hour. Sixty loads of 3,734 pounds each equals 100 tons per hour, which is clearly possible.



Fig. 8.—Haul down block and load carriage taking load from deck of collier. It requires about five seconds to hook on 3700 pound loads and raise them clear of the deck.

The Automatic Tension Engine—A New Marine Implement.

The automatic tension engine is a self-contained unit. It has two steam cylinders driving a common crank-shaft. A pinion on the crank-shaft drives a gear firmly keyed to the drum-shaft. The drum mounted on the drum-shaft is connected to it by huge coil springs, allowing a limited rotation of the drum on the shaft. Changes in tension in the rope cause the drum to rotate slightly on its shaft. This motion of the drum on its shaft is transmitted to controlling valves and raises and lowers the steam pressure as required.

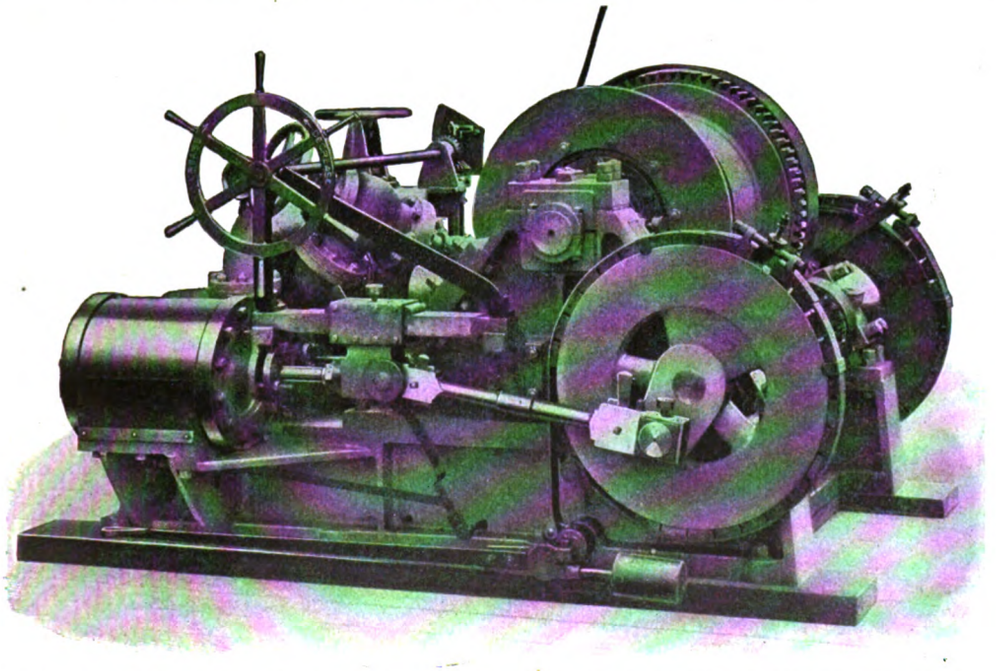


Fig. 9.—Automatic tension engine (13" by 13") on collier to maintain a constant tension in the main trackway cable of 18,000 pounds. This machine displaced the sea anchor of earlier marine cableways.

This spring drum construction, therefore, is a feeler or detector of tension changes. The steam for operating the engine is introduced into the cylinders through a novel form of controlling valve. This valve regulates the amount and pressure of the steam supplied to the cylinders. Suitable lever connections between the drum and this valve couple these two elements together in such a way that

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the steam supplied to the cylinders bears a definite relation to the tension in the rope.

A slight increase in the tension of the cable produces a reduction of the steam pressure, permitting the rope to overhaul the engine and restore the tension to normal. A reduction of tension produces an increase of steam pressure, again causing the engine to act as a take-up to restore the tension to normal. The tension developed by this engine in pulling in is slightly less than the resistance set up in the cable to overhauling, but for all practical purposes the tension is uniform and constant.

Experiments at the testing station have been made in an endeavor to determine the interval of time between the slackening of the cable and the starting of the engine. No one has been able to measure the interval. To all intents and purposes it is instantaneous.

In addition to the automatic control of the tension fluctuations, the engine is provided with means for manually regulating the tension.

Oil Bunkering Under Headway at Sea.

The British Admiralty require a towing speed of at least 10 knots while refueling at sea. They coaled at sea in 1906 at a speed of 11 knots. The British Admiralty's tank steamer "Petroleum" trans-shipped oil at sea at towing speeds above 12 knots. The method they employ is practicable when the sea is smooth. Shipping Illustrated, November 2, 1912, says: "The operation of bunkering at sea while steaming at a rapid rate is regularly carried out by way of training. . . . Other nations have now adopted this method which is very effective but needs great care in seamanship and no little patience."

The British battleships tow the oil tank ship. One hawser tows and a secondary line supports the oil hose by hangers at frequent intervals. This plan was tested by United States ships with a small hose.

The tank steamer "Petroleum" carries 900 feet of 5-inch diameter flexible bronze hose, weighing 9 pounds to the lineal foot, a total of 8,100 pounds. The distance between ships is about 600 feet. The greater portion of the hose drags in loops in the sea. This results in great longitudinal strains, which damage the hose. The loops gather down against the bow of the towed ship, which affects the towing. They form many sharp bends which shorten the life of the hose. Eighty tons of oil per hour are thus trans-shipped.

The United States Trial Board, testing this method between the fuel ship "Arethusa" and the destroyer "Warrington," used a 2½-inch hose. They reported the difficulties substantially as mentioned above.

An oil hose supported in this manner permits oil bunkering to be carried on in heavy seas. The automatic tension engine furnishes the necessary elastic medium for paying out and taking in the supporting cable as demanded by the motion of the ships. It maintains a uniform tension on the supporting line and prevents any lashing or whipping of the hose while the operation is being carried on in a heavy sea.

The weight of the 5-inch metal hose and the oil to be supported by the suspended cable is double the weight of the carriage and coal bags of the marine cableway. The necessary tension in the supporting line would be the same in both instances. The oil hose is a uniformly distributed load; the bags of coal a concentrated load frequently in the center of the span.

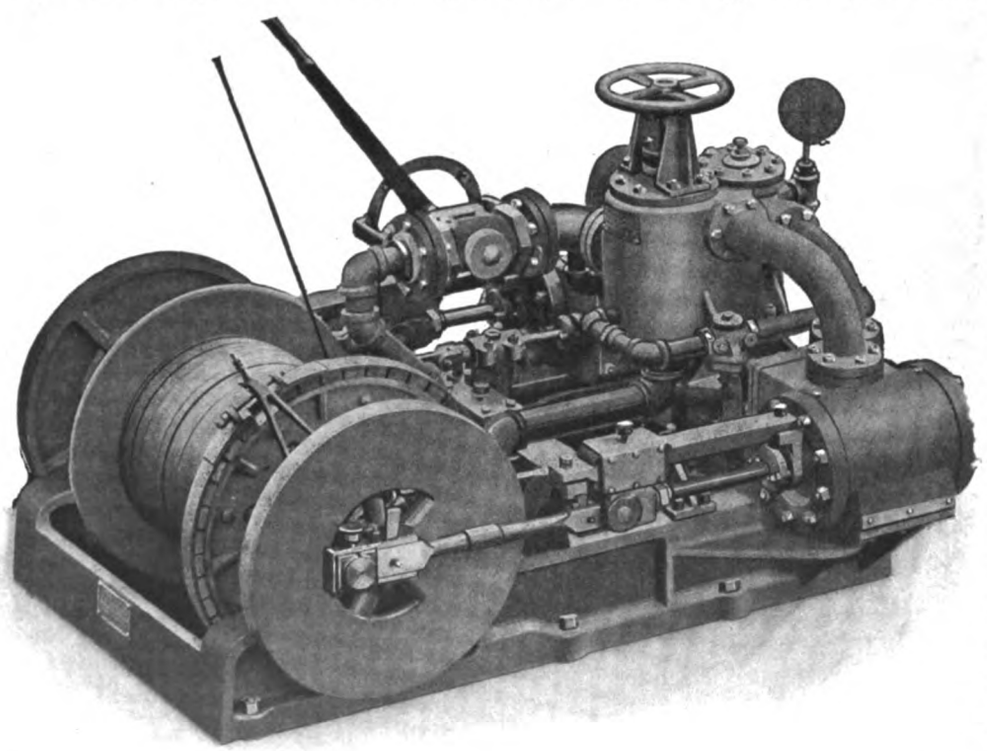


Fig. 10.—10" by 10" automatic tension engine. Two of these operate the carriage from collier to warship and maintain a uniform tension in the conveying ropes whenever load carriage stands still.

The automatic tension engine now installed on the collier "Cyclops" will develop a tension of 18,000 pounds and will sustain a 5-inch flexible bronze hose and a 1-inch diameter steel wire rope on a span of 600 feet with a deflection of

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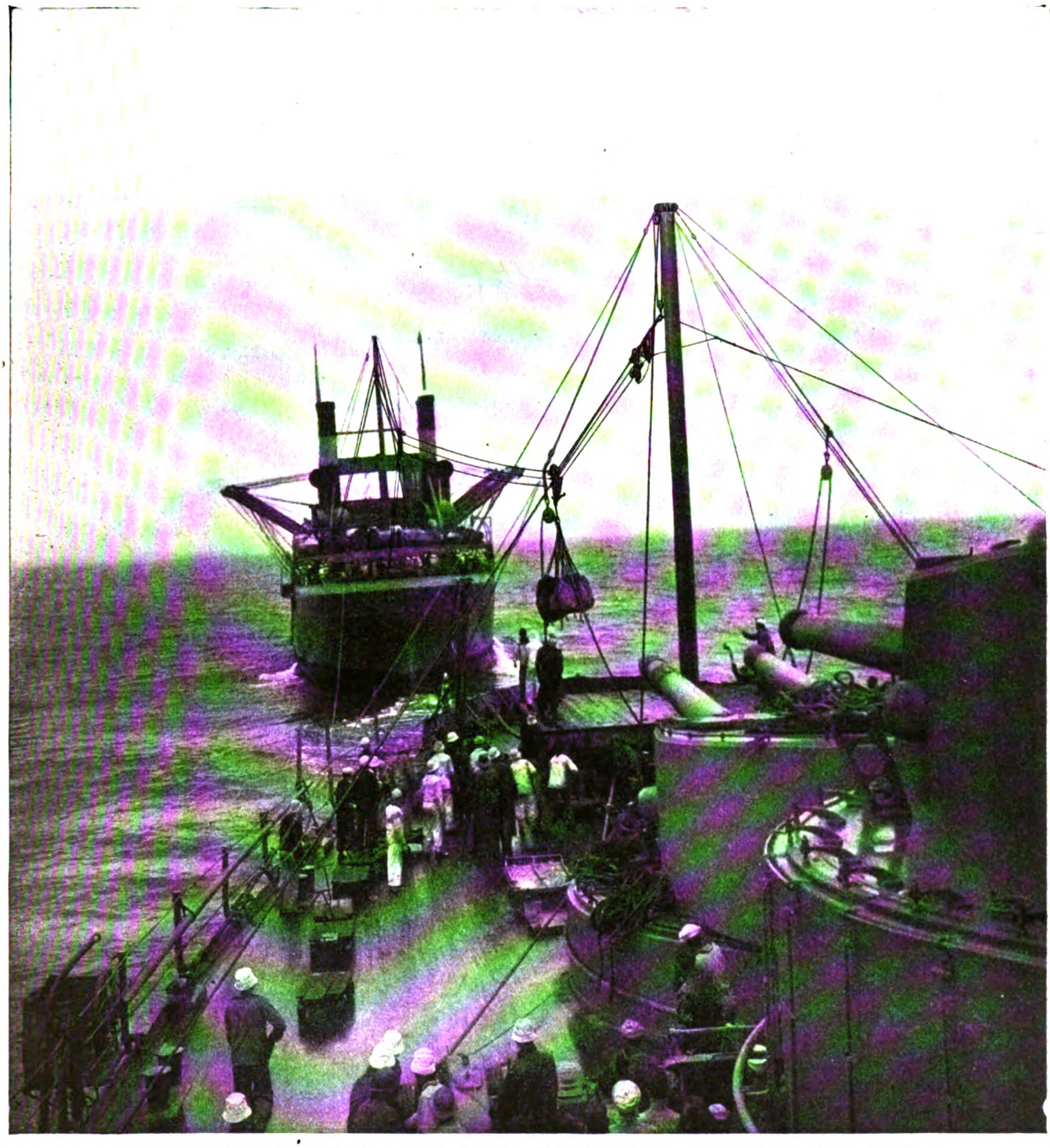


Fig. 7.—U. S. S. South Carolina coaling from U. S. Collier "Cyclops." The first load about to land.

about 58 feet. The rear mast of the "Cyclops," with its heavy pulley block secured to the masthead for coaling at sea, is needed for oil bunkering at sea. The collier "Cyclops" carries both oil fuel and coal. Many of our battleships burn both kinds of fuel. The "Cyclops" can deliver either fuel if provided with a suitable oil hose, reel and oil pumps.

Oil bunkering at sea by such improved method can be carried on in a heavy sea, the time required for setting up and taking down the hose would be reduced, and all damaging strains in the line eliminated.

Our Fleet Called to Buenos Aires.

Rear-Admiral Bradley A. Fiske, U. S. N., in his prize essay before the United States Naval Institute, June 1, 1905, points out that:

1. Our fleet should always be kept as full of coal as possible.

2. The only way to accomplish this is to have the colliers with the fleet continually in sight of the flagship.

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3. A shore base insufficiently protected to withstand a probable enemy is an element of weakness rather than of strength.

With the above facts in mind imagine the Atlantic fleet sailing from New York to Buenos Aires, the United States being at war with a European power. The fleet would be accompanied by colliers. The fleet would probably steam at 10 knots to 12 knots. The shortest route is about 5,400 miles. This fleet should be kept as full of coal as possible, as Admiral Fiske indicates. If these vessels could fill their bunkers on the high seas without reducing their speed they will arrive with their bunkers practically full and in the shortest time and with the least consumption of fuel.

Battleships and cruisers of the Atlantic fleet can be coaled at sea without reducing the speed of the fleet below 12 knots. The proof for this resides in the results achieved with the marine cableway coaling the U. S. S. "South Carolina" (Capt. Thos. Snowden commanding) from the U. S. collier "Cyclops" at sea; coaling the U. S. S. "Virginia" (Capt. Jas. Glennon commanding) from the U. S. collier "Vestal"; coaling the Italian cruiser "Liguria" at sea in Italy; coaling the "Trafalgar" and "Empress of India" at sea in England.

The trials of the "South Carolina" are representative of an average performance coaling in a seaway sufficiently rough to cause the collier "Cyclops" to roll 20 degrees.

In the "Virginia" trials the coaling operations were carried on for over an hour in a dense fog in which it was impossible for one ship to see the other.

In the Italian test the light cruiser "Liguria" of only 2,280 tons displacement was coaled at a towing speed of 12 knots when the screws of the cruiser were seen by the collier in tow.

In the English trials of the marine cableway, the towing speed was 11 knots, and the trials were carried on in half a gale of wind.

It would be difficult to exaggerate the importance of the passage of a fleet for over 5,000 miles without risk of violating the neutrality of any nation in coaling in their sheltered waters, nor in the delay or dangers incident thereto.

It is frequently asserted that there are numerous days when colliers and battleships could come alongside to coal. The equipment of these colliers with marine cableways would not prevent the ships coaling broadside whenever the sea and weather permit. The marine cableway insures coal to the fleet in all reasonable conditions of sea and weather.

Equipping such colliers as the "Jason" with marine cableways adds less than 3 per cent. to their cost, and in the case of war would undoubtedly double their value.

The development of the marine cableway for coaling at sea has covered a period of twenty-one years and the device may be regarded as "being of age" in the year 1914. This apparatus, incorporated into the U. S. fleet for drill, practice, and use in maneuvers, will bring out its whole value.

RECENT HARBOR EXPENDITURES.

The following tabulation covers money spent by the Board of Harbor Commissioners at San Francisco out of the $9,000,000 bond fund voted by California for improving San Francisco's State-owned water front. The $2,400,000 odd still remaining in this bond fund is to be expended on new wharves at the north end of the water front and possibly a few wharves near the southern end of the seawall. In November, 1914, an additional $10,000,000 was voted so there is still a large fund available for new work on the front.

Pier No.	Type of Constr.	Amount
27	Creosoted Piles	$ 11,208.95
46	" "	75,691.51
25	" "	12,670.32
17	" "	302,218.90
30 and 32		1,256,763.70
26	Blasting rock	11,204.59
28		451,020.54
26		647,102.99
Belt Railroad across Market St		17,883.24
Seawall Section 9-A		379,308.52
Seawall Section 9-B		233,674.89
Pier No. 39		520,624.67
Belt Railroad Tunnel		323,090.87
Ferry Slip No. 8		73,829.55
Car Ferry Slips		278,315.44
Wharf Section "C" Seawall		14,042.23
Pier No. 41		227,605.98
Pier No. 15		163,478.71
Pier No. 54 Extension		20,887.97
Paving the Embarcadero bet. Harrison and Brannan Sts		56,834.12
Wharf Section "D" Seawall		15,619.66
Pier No. 35		155,212.30
Ferry Slips 9 and 10		221,244.13
Slip No. 7 and Ferry Bldg. Foundation		101,353.69
Pier No. 37		287,177.75
Pier No. 16		167,809.07
Pier No. 18		164,726.17
Paving Main and Fremont Sts		11,473.04
Post Office Building		42,841.48
Ferry Building Extension		68,985.66
Pier No. 24		23,316.05
Fire House		7,369.34
Wells Fargo Building		15,878.71
Landing Floats		5,069.50
Belt R. R. Imp. and Equipment		177,466.53
Preliminary exp. on proposed work		13,779.61
Materials on hand		105,666.78
Expenditure to March 31, 1915		$6,562,457.16

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The docking of the "Northern Pacific" to effect repairs to the rudder, which was evidently damaged by jamming on a log or some wreckage, was highly interesting owing to the fact that the dock was only able to raise one end of the vessel.

S. S. "NORTHERN PACIFIC'S" RUDDER ACCIDENT.

When the rudder of the splendid big turbiner the "Northern Pacific" became disabled at or near the Columbia river bar, a story that the big new Portland-San Francisco boat had struck the bar was given wide publicity. This was unfortunate at the time when the Government after immense expenditure had seen its long years of patient digging and jetty buildings rewarded and could at last look forward to a definite conclusion of the work at the mouth of the Columbia. As a matter of fact an examination of the damaged rudder of the "Northern Pacific" demonstrated clearly that the vessel could not have struck the bar and indicated the cause of the trouble to be a log wedged in between the rudder top and the skin plating of the ship.

The accompanying photograph shows the "Northern Pacific" in the Oregon Dry Dock on June 18. The stern of this steamer was entered into the dock a distance of something over 200 feet, and the dock was then pumped out sufficiently to raise the stern so as to expose the rudder coupling. The coupling was disconnected, and with the assistance of a diver the rudder was unshipped. The rudder was then taken into the shop, where it was discovered that the frame was badly distorted and the side plate and filler were completely gone. The frame was faired up, welded where broken, refilled and new side plates put on. During the time this work was being done, the boat was removed from the dry dock and redocked on June 22. The work was completed on June 23. The manner of handling this particular work was a source of considerable interest at Portland, as the docking facilities were not such as to raise the rudder completely out of the water.

The cut also shows the dredge "Monticello" of the U. S. Engineers' Department just being completed, this craft being turned over to the Government the day after the picture was taken. The stern wheel steamer "Harvest Queen," also shown, was having a broken shaft replaced. The other boat is the Port of Portland bar tug "Wallula." She is having a new boiler installed, a large, three-furnace Scotch marine boiler fitted with the Dahl Union Iron Oil Burning System.

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PACIFIC MARINE REVIEW

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BOOM CREATES WRONG IMPRESSION.

The Seattle Daily Times is a warm advocate of an American foreign trade merchant marine and has been so for a good many years, but recently in an editorial under the caption of "Uncle Sam—Shipbuilder" this leading Northwestern newspaper falls into a grave error. In the editorial occurs the following passage:

"Eastern yards are said to have more contracts for ships than they could handle in five years.

"Abruptly in a few weeks the situation in the shipbuilding world has changed. America, which formerly could not turn out vessels at anything like the price made by foreign yards, is now able to underbid competitors even in Great Britain.

"It is not surprising, therefore, that up to June 1 contracts had been let for thirty-six ships, although the foreign buyers did not enter the American market to any degree before December. These ships are being built, however, for foreign owners and will fly the flags of other states. They are designed to take the place of vessels destroyed during the war or commandeered for military purposes."

The above conception of the present shipbuilding activity on our eastern seaboard is entirely erroneous. Of the thirty-six ships referred to, only two are being built for foreign owners and the order for these vessels was not secured by underbidding but through the promise of early delivery. However one views the present shipbuilding boom, his enthusiasm will be somewhat checked when he realizes that about two years of practical stagnation in shipbuilding circles preceded it and the question naturally arises, are the shipbuilding firms merely catching up with a normal demand by filling long delayed orders or is the industry entering upon a period of prosperity that will last for a period of years?

B. F. ISHERWOOD DEAD.

In the death of B. F. Isherwood, engineer-in-chief of the U. S. Navy, one of the last living connections between the earliest and the latest phases of the steam engine has become a memory. In 1844 at the age of 22, Isherwood joined the Navy and was shortly afterwards given the post of engineer-in-chief of the Bureau of Construction, Equipment and Repair. From 1862 to 1869, Isherwood was the head of the Bureau of Steam Engineering. It would not be too much to say that his work literally forced the engineering of the United States Navy into modern channels and yet he received nothing but abuse during his incumbency. Of late years, however, the work of Isherwood has been appraised nearer its true value and no name in the engineering annals of the Navy holds a higher place than his.

What might be termed a wave of understanding has swept over the country in regard to the Seamen's Act. The framers and backers of this remarkable piece of legislation have been thrown clearly on the defensive as the difficulties surrounding the enforcement of the new law and the strenuous and rapidly spreading opposition to its objectionable features become more and more apparent. Over half a million tons of shipping has come in under the American flag in the past ten months through transfer of registry, but now it is freely predicted that we will lose at least half a million tons during the next ten months by a reversal of the same process. Indications that foreign nations will use the treaty-breaking features of the Seamen's Act as a lever for securing many concessions are increasing day by day.

Among the many appeals to Wilson to do something about the Seamen's Act is one from the Maritime Association of the Port of New York numbering eight hundred representatives of domestic and foreign steamship lines. The resolution appeals for a special session of Congress to repeal the Seamen's Law and sets forth that unless something is done that some old, well established lines will be forced out of American ports entirely.

A recent hydrographic survey of Humboldt Bay bar by Government Engineer George Steele shows a controlling depth of twenty-three feet. This is a gain of just one foot over twelve months ago and the Government officials are gratified at the results being produced by the jetties.

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LIGHTHOUSE EXHIBIT.

The exhibit of the Lighthouse Service at the Exposition is located in the palace of machinery and is both historical and practical.

Among the exhibits peculiarly interesting to Pacific Coast people are seven water colors, painted in 1859, depicting certain old light stations that preceded the first U. S. Government lights. An old 10-pounder cannon borrowed from the Benicia arsenal in 1855 and used at Point Bonita Light Station is also on exhibit. This gun was fired at thirty-minute intervals during fogs and was the first fog signal on the coast. An old third-order lens of the Fresnel system is shown. This was the first lens to be installed on the Pacific Coast, being put in at the Alcatraz Light Station in 1854 and used constantly until 1902, when it was replaced by a modern fourth-order lens. The steady advance of the lighthouse lamp is shown by a first-order mechanical sperm oil lamp, one of the same order using lard oil, a plunger lamp using kerosene and a second-order kerosene lamp operated by air pressure.

The great lighthouses at Spectacle Reef, Lake Huron, Tillamook Rock, Oregon, Fowey Rocks, Florida, and Minots Ledge, Massachusetts, are represented by scale models. Hull models of the lighthouse tender "Sequoia" and light vessel "No. 94" are also shown. A modern fourth-order flashing lens is shown complete, and two forms of fog-bell strikers, are mounted on either side of a 1,000-pound fog bell. The third-order cylindrical helical-bar lantern, made especially for the Galveston Jetty Light Station, Tex., now under construction, is exhibited in one angle of the inclosure. It is also the intention to exhibit the lens as soon as possible. Other exhibits to be added in the near future include the parapet deck, watch room, and the helical-bar lantern for the new light station at Cape St. Elias, Alaska, together with its lens and fog-signal apparatus.

In addition to the above, there are also on exhibition a large whistling buoy, weighing 6,500 pounds; a bell buoy and ballast ball, weighing 7,150 pounds; one each first-class tall-type can and nun buoys, weighing approximately 8,300 and 7,400 pounds, respectively; one each third-class tall-type can and nun buoys, weighing approximately 2,900 pounds each; a first-class mushroom anchor, and a first-class iron sinker, each weighing 5,000 pounds.

Modern lighthouse lamps are illustrated by two incandescent oil-vapor lamps using 35 and 55 millimeter mantles, respectively, and are complete in all their details. The smaller orders of lenses are represented by one- and eight-day post lanterns and one- and five-day lens lanterns. A most recent type of a fog signal is illustrated by a 6-inch automatic siren, operated by compressed air, together with its quick opening valve and timing device for regulating the number and length of blasts per minute.

GREAT NORTHERN PACIFIC STEAMSHIP COMPANY.

Portland, Oregon, June 30, 1915.

Portland Chamber of Commerce,
Attention Mr. W. D. B. Dodson,
Trade and Commerce Bureau.

Gentlemen:

I have yours of June 29th making inquiry regarding the recent rudder trouble of the steamship "Northern Pacific."

In reply I beg to state that this trouble had no connection whatever with the Columbia River bar, except that discovery of the trouble was made at a time when the ship was in that location. The ship did not ground on the bar, or at all; in fact, at the time in question, it would not have been possible for her to strike the bar as the tide was almost at flood and there was no sea. As the ship draws less than twenty-one feet of water, the absurdity of the claim that she struck the bar will at once be apparent.

A survey of the injury was made by competent marine surveyors representing the owners and the underwriters. The report of these surveyors is unanimous to the effect that there was no grounding. They attribute the injury to contact with some submerged object, such as a log or piece of wreckage, which probably became wedged in between the stern and top frame of the rudder, deflecting the frames and starting some of the bolts. The injury was probably slight at first but progressive so that the rudder plates were finally torn away by the action of the water as the ship moved through it at a high rate of speed. The surveyors were also unanimous in their conclusion that the original injury antedated by some days the discovery, which was made as the ship turned on a sharp angle to enter the Columbia River. The survey showed the rudder frames deflected downward and that the stern frame was uninjured. Had she struck her stern on the bar the rudder frames would have been deflected upward and in all probability the stern frame would have been injured.

The accident was not at all a serious one and would be considered trifling except for the necessity of taking the ship out of service during the time necessary to bring her to Portland for repair.

Think the above covers the matter fully, but if there is anything further that I can give you, please command me.

Very truly yours,
(Signed) L. C. GILMAN,
President.

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Portland, Oregon, July 7, 1915.

Mr. W. D. B. Dodson,
c/o Portland Chamber of Commerce,
My Dear Mr. Dodson:

Your letter of June 29th was received during my absence from the City, which will account for my delay in answering.

It is impossible to state, definitely, the actual cause of the damage to the rudder of the S. S. "Northern Pacific." We can, however, state positively that it was not caused by striking the bar at the mouth of the "Columbia" or at any other point. The reason why we can state this positively is that the rudder frame was bent downward considerably over a foot at the after end. If the rudder had struck on the bar, the natural result would have been the bending of the rudder upward.

There are two or three reasonable theories, which would account for the condition in which the rudder was found, but there is nothing to prove definitely which theory is correct. Therefore, as stated above, the only thing we know positively is that the damage was not caused by the vessel striking on the bottom.

Trusting that this information will be all that you require, I remain,

Yours very truly,
(Signed) B. C. BALL,
President Willamette Iron & Steel Works.

Portland, Ore., June 22, 1915.

Mr. W. D. B. Dodson,
Trade Commissioner,
Portland Chamber of Commerce.
Dear Sir:

We the undersigned Master and Pilot of the S. S. "Northern Pacific" do say that when entering the Columbia River on June 15, 1915, at about 1:15 p. m. we are sure that the vessel did not strike the bottom at any time during our passage over the bar and through the channel leading up to Flavel.

At the time of crossing there was 36 feet of water on the bar.

Respectfully yours,
(Signed) A. T. HUNTER, Master,
CHAS. LUNDQUIST, Pilot,
S. S. "Northern Pacific."

The above letters show clearly that the recent rudder injury to the steamer "Northern Pacific" was not caused by grounding on the Columbia River bar or elsewhere. Portland people naturally resented the widespread intimation of a partial failure of the Government's great work at the Columbia River entrance and the "Pacific Marine Review" takes pleasure in doing its part towards the removal of a false impression.

FREIGHT REPORT.

By PAGE BROS.

The date of our last report was June 17th. Freights have remained steady on this Coast, and not so much has been doing, as charterers were looking for lower rates owing to the weakness shown in the Argentine Republic, which also affected the East Coast of the United States. We have to report from Portland by Mr. Houser, steamer "Asama Maru" to Australia on private terms, and the sailers "Cardonia" and "Springbank" at 85/- for U. K., also "Svithiod" and "Pierre Antonine" and "Bayard" at 80/-, and the "Favell" at 81/3, November loading, and 80/- December. Strauss & Co. chartered steamer "Veturia," now discharging at San Diego, at 82/6 for U. K. (orders at San Francisco Heads), to load either here or Portland or Puget Sound. Balfour, Guthrie & Co. have chartered steamer "Constantinos 12" at 85/- for grain to U. K., from this port, option of 87/6 for merchandise; also the steamer "Ormiston" to load general cargo to U. K. The same firm chartered French sailer "Ville Du Havre" for barley from this port at 82/6, prompt loading. With the new crops—and abundant ones—soon to come in from the harvest fields all through the United States, we look for a decided increase in demand, and with the scarcity of vessels, naturally higher rates are apt to follow.

Lumber freights continue very active, and as before, Australia is the country most eager for lumber. As high as 95/- per thousand feet from this Coast to Sydney has been paid, option of Melbourne at 105/-, and some schooners have been chartered as far as July 1916 cancelling, on basis of about 82/6 to 85/- for Sydney, 10/- additional for Melbourne, so that owners of our coasting vessels will have a chance, not alone to clear the vessels of debts incurred during the last three years, but will now be receiving handsome dividends as well.

From the West Coast of South America, owing to the financial conditions, the demand for lumber is very small, the only transactions reported being the bark "Helvetia" by Mohns Commercial Co., and the "Espada" and Peruvian bark "Judith" from Grays Harbor to a direct port in Chile or Peru, the rates on which are supposed to be about 82/6.

No charters have been drawn for Africa since our last report.

For U. K. the British Admiralty have put in steamer "Trevince" to carry lumber from Chemainus. The prospects are that the steamer "Jason" will also load lumber for the British Admiralty.

For coal from Norfolk, Virginia, for the United

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States Government, the steamer "Veturia" obtained $6.50 to San Diego, and steamer "Highbury" and a steamer yet to be named, got $6.35 for San Francisco, and during the last ten days two more steamers were chartered by the Government to this port at $5.25. Steamer "Werribee" is loading a full cargo of hay in this port for the Victorian Government, Australia, and G. W. McNear is to load the steamers "Europa Maru" and the "Queen Maud" with the same commodity, also for the Australian Government.

During the fiscal year ended June 30, 1915, there were built in the United States and officially numbered 1226 vessels of 215,711 gross tons, compared with 1291 vessels of 311,578 gross tons for the same period of 1914.

The principal vessels are two colliers built for Panama Canal trade, the "Achilles" and the "Ulysses," of 11,081 and 10,910 gross tons, respectively.

Other vessels over 5000 gross tons are the "John D. Rockefeller," a tanker of 8374 gross tons; the "Great Northern" and the "Northern Pacific," of 8255 gross tons each, built for passenger service on the Pacific Coast; the "J. A. Moffett," 6395 gross tons, and the "Lyman Stewart," 6054 gross tons, both tankers and built on the Pacific Coast.

Only one large sailing vessel was built during the year, the "Georgia," a schooner, of 1318 gross tons.

In all, twenty-three vessels of over 1000 tons each were built, aggregating 123,242 tons.

On July 3, the new Southern Pacific ferry "Santa Clara" went through a successful series of trials on San Francisco Bay. The "Santa Clara" is a sister vessel to the "Alameda," fully described in previous issues of the "Pacific Marine Review," and is the twelfth ferryboat in the Southern Pacific fleet. She was designed in the local offices of the railroad company, the steel work on the hull was fabricated and set up by the New York Shipbuilding Company, knocked down, shipped to East Oakland and re-erected at the Southern Pacific shipyards. The engines and all the joiner work are solely the output of the railroad shops and shipyard.

The Fore River Shipbuilding Corporation on June 12 launched the first of ten submarines building for the British Government. The boat is of the Holland type, with a cruising radius of about 1500 miles and a speed of 7 knots submerged and 15 on the surface. These boats will not be delivered until the close of the war.

The following summary of business with the Osaka Shosen Kaisha for the second six months of 1914 is of interest:

PROFIT AND LOSS ACCOUNT.

Dr.

	Yen	Yen
To ship's expenses	3,089,426.28	
Passenger and cargo ex	1,838,514.59	
Charter money	547,942.30	
Office expenses	758,708.43	
Miscellaneous expenses	578,106.55	
		6,812,698.15
Insurance fund	368,000.00	
Repair fund	552,000.00	
Depreciation on fleet	544,000.00	
		1,464,000.00
Net profit		1,346,231.35
Total		9,622,929.50

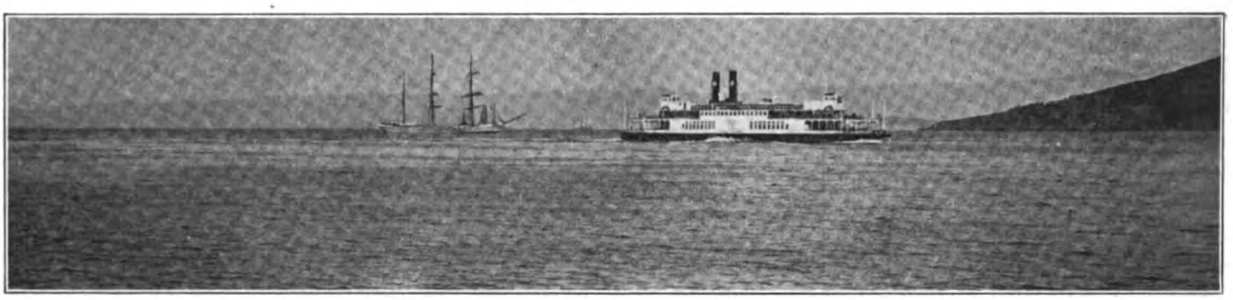
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	Yen
By freight, and passage money	7,167,528.45
Subsidies	1,228,175.42
Miscellaneous receipts	1,227,225.63
Total	9,622,929.50

Disposition of Profit.

	Yen	Yen
Profit for this term		2,810,231.35
To Insurance fund (slightly over 4% per annum on the reduced book value of fleet)	368,000.00	
Repair fund (slightly over 6% per annum on the reduced book value of fleet)	552,000.00	
Depreciation on fleet (slightly over 4% per annum on the cost of fleet)	544,000.00	
		1,464,000.00
Net profit		1,346,231.35
To reserve fund	67,500.00	
Directors' and Auditors' fees	67,500.00	
		135,000.00
Balance		1,211,231.35
Amount brought forward from last term		564,102.05
		1,775,333.40
To Dividends (10 per annum)		910,800.00

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Pacific Coast Shipping Notes

Orders for machinery for the Columbia River Coal Dock Company's North Portland harbor bunkers are now being placed and it is expected that the new dock will be in operation by October 15. Lowther Ferris, formerly sales manager of the Canadian Collieries, Dunsmuir, is now manager of the new Portland corporation. James Rolph of the firm of Hind, Rolph and Company is one of the large stockholders in the new coal dock project.

Among the steamship men who visited San Francisco during the past month were Lewis K. Thurlow, member of an old New England ship owning family and a dominant figure in the firm of Crowell and Thurlow.

Captain Judson Thurber, for fifteen years master of the "Hartley," has been shifted to New York and given the command of a Coast Guard cutter there. Thurber was widely and favorably known to hosts of ship officers who have visited San Francisco.

The American-Hawaiian steamer "Honolulan" set up a new record for a freighter in making the trip from New York to San Francisco with a capacity cargo in eighteen days. She brought fifteen passengers, among whom were Harry Evans of the local brokerage firm of E. C. Evans and Company, local agents for the Maple Leaf Line, and John B. Norris, Vice-President of the Ellicott Machine Corporation, Baltimore, Maryland. Mr. Norris is looking over the western field and incidentally having a peep at the Exposition. The Ellicott Corporation are ship and engine builders who have earned an eviable reputation especially in large dredger work.

Captain Jack Griffith, formerly of the Admiral Line, is now foreman of the Miraflores Locks on the Panama Canal. Griffith was a well and widely known officer in the Coast service.

At the eighth annual convention of the National Gas Engine Association, Mr. O. H. Fischer, vice-president and general manager of the Union Gas Engine Company of San Francisco, was elected one of the vice-presidents of the Association.

Mr. H. F. Alexander, president of the Pacific Alaska Navigation Company, spent the latter part of July in San Francisco. Mr, Alexander was accompanied by his family and was bent on pleasure as well as business.

The well-known motor ship "Suecia," of the Johnson Line, was loaded at Stockholm about July 15th for this port. The "Suecia" follows the new motor ship "San Francisco," which will leave on her return voyage during the early part of this month.

The presence of the "Tacoma" at pier 37 during the early part of the month marked the opening of the Oriental Pacific Line on a regular *four* weekly schedule. The "Tacoma," in conjunction with five other large dead weight carriers, is being operated between Shanghai, Hongkong, Kobe, Yokohama, Manila and San Francisco. The local agency for the Pacific coast is vested in the old established firm of Swayne & Hoyt, with offices at 430 Sansome street.

The steamer "M. S. Dollar," of the Dollar Steamship Company fleet, has been sold to Birkhill & Company of Shanghai on private terms. As the Dollar people disposed of the "Mackinaw" to the Flood Brothers some time ago, the "M. S. Dollar" makes the second vessel that has been "gotten out from under" the Seamen's Act. The rest of the Dollar fleet will be either sold or changed over to British registry, whichever happens to be most expedient.

Practically all the tow boat owners on Puget Sound are enrolled in the newly formed tow boat owners' association, which was recently formed with the following trustees: A. L. McNealy, Pacific Tow Boat Company, Seattle; George Francis Fay, Drummond Lighterage Company, Seattle; George E. Plummer, Puget Sound Tug Boat Company, Seattle; H. O. Foss, Foss Launch Company, Tacoma; L. S. Wood, Washington Tug & Barge Company, Seattle; H. O. Benedict, N. L. Johnson Towing Company, Seattle; Capt. Harry Ramwell, American Tug Boat Company, Everett.

C. W. Wiley, who was until early in the year general manager of the Pacific Alaska Navigation Company, has entered the service of the Great Northern Pacific Steamship Company as superintending engineer. C. C. Lacey, who has had

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charge of the engineering maintenance of the "Great Northern" and "Northern Pacific" up to the present change will, it is understood, now act in the same capacity for the big transpacific liner "Minnesota." Both of these engineers and steamship men are widely and favorably known up and down the Pacific Coast. Mr. Wiley started his career with the Boston Tow Boat Company and the Boston Steamship Company, coming to Seattle as their marine superintendent when they established a west coast service.

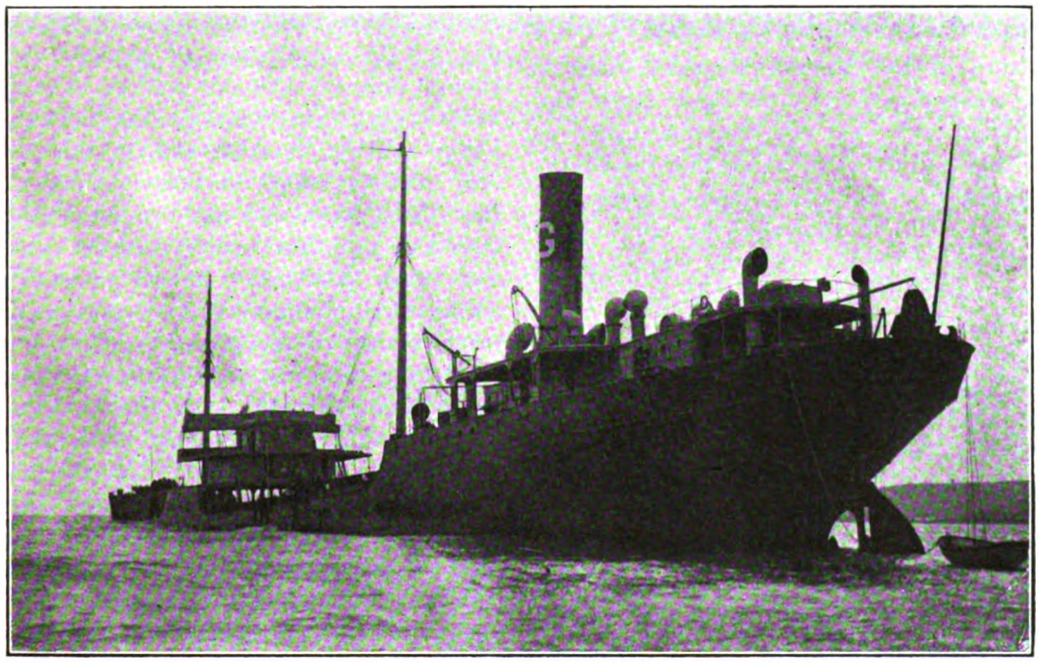
The Board of Directors of the Alaska Steamship Company recently declared an extra dividend of five per cent. aside from their regular quarterly dividend of 1½ per cent. This makes a total payment of eight per cent. for the first half of the year, the increased earnings being due to a very favorable Seattle-Alaska carrying trade. The capital stock of the company is $3,000,000.

One of the most interesting salvage operations recently carried out was the recovery of about $100,000 in gold dust from the wreck of the "Islander." The "Islander" foundered about five miles south of Juneau, Alaska, in August, 1900, in about 300 feet of water. The venture for the "Islander's" gold was financed by the Dunbar brothers and operations were carried out by means of a diving bell.

The Border Line Transportation Company has made the following announcement of changes in their agency forces: The position of traffic manager, formerly held by Mr. H. C. Bradford, will be temporarily unoccupied. Mr. B. L. McMullen is appointed general freight and passenger agent. Mr. L. L. Bates is appointed traveling freight and passenger agent, and Mr. E. L. Matteson is appointed dock agent at Pier 4, Seattle.

On and after September 1st the price of coal at the Panama Canal will be increased to $6 a ton delivered alongside at Cristobal or Colon and $7 a ton delivered at Balboa on the Pacific side. The reason given for the raise in prices is the scarcity of colliers and the high charter rates prevailing.

According to the Honolulu Pacific Commercial Advertiser it may be weeks before the submarine "F-4" will be moved again from its present berth in forty-five feet of water. The submarine was originally sunk in 306 feet of water and has been brought to its present position by the use of pontoons. The job of salvaging this little craft seems to go very slowly.



The American steamer "Gulflight" as she appeared after being torpedoed by a German submarine.

The Seattle Port Commission has taken under advisability the project of building a belt railroad on Whatcom and Railroad avenues from Spokane avenue to Washington street.

Captain M. Madsen, formerly master of the steamer "Caspar," has been appointed port pilot for San Pedro by the Pilot Commissioners.

The Wm. Powell Company of Cincinnati, Ohio, has just issued a handy little booklet describing the most frequently called for of the Powell Accessories for oil wells and refineries. The Powell Company as manufacturers of the celebrated White Star valves has earned a very high position in the trade and their latest booklet will prove of interest to engineers and purchasing agents and can be had by addressing the company at Cincinnati.

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European Marine Notes

[From our own Correspondent.]

London, July 8, 1915.

Japan, Panama and Great Britain.

The decision of the Nippon Yusen Kaisha to establish a steamship service to New York and other American ports via the Panama Canal is regarded in this country as meaning that the course from Yokohama to New York, Japan's great silk and tea market, will be shortened by some 3,500 miles as compared with the route by way of Suez. For steamers maintaining a speed of 12 knots there will be a saving of the same number of days. So far as the cotton trade is concerned the new route will, of course, cheapen the freight, as the Nippon boats will call regularly at Gulf of Mexico ports and therefore increase the import while reducing the quantity of the staple which Japan now takes from India. It will probably also affect the sale of British cotton fabrics in China. Moreover, it is believed by people here who claim to know that the cheaper import of cotton from the United States will enable Japanese merchants to place their goods on the Indian market at a lower figure than at present, and thus render competition with British exporters more acute. There are, in fact, many possibilities in this new development, and the situation will be carefully watched by British export, import and shipping interests.

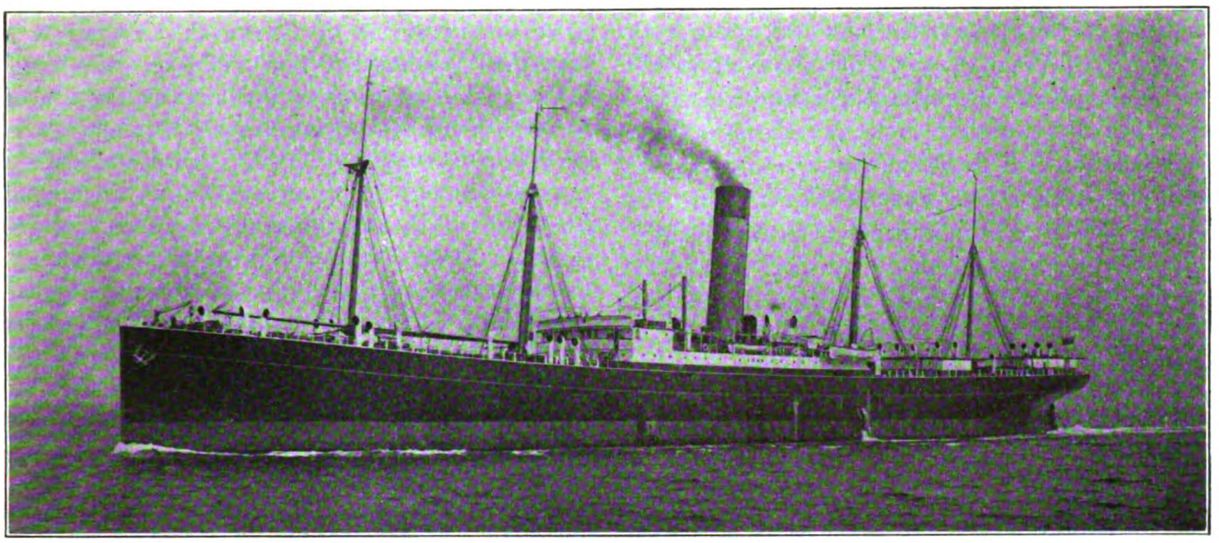
Record Prices for Ships.

The intervention of Italy has released for use by that country over 200,000 tons of enemy ships, and this will, it is expected, ease the chartering market somewhat. Conditions are, however, abnormal, in consequence of so many vessels being required for transport and other purposes. The result is that the price of steam tonnage is on the increase, and to make matters worse, the building of merchant ships is now almost at an end. Some yards which were ordered to be closed so that men might be transferred to naval establishments have not yet stopped work pending some arrangement as to compensation. There is at present no power to grant this, but I understand that action in the matter is about to be taken. As showing the difficulty of placing orders, I may mention that a well-known owner was refused a price the other day for the construction of an 8,400-ton vessel, although delivery was not wanted in less than three years. Of course, boats on the stocks partly completed will be finished, and, in this connection, I hear of one which is now building in a North East Coast yard, and has just been sold for $345,000, although last year's contract price was not more than $250,000. In consequence of the inability of shipbuilders to undertake mercantile contracts owing to the pressure of naval work there for a long time has been an enormous demand for second-hand vessels, with the result that values have risen to a phenomenal level, and prices are still rising. An interesting case is that of a Norwegian steamer, which was sunk three months ago off the Nore. She was raised in a badly damaged condition, and has just been sold for $60,000, notwithstanding the fact that repairs are estimated to cost her new owners about $50,000. Then, again, a Greek steamer, the worth of which before the war was not more than $200,000, has now changed hands at $375,000. Naturally, these large prices are tending to increase the value of provisions and materials, as high freights have to be charged by shipowners.

Limitations of Profit.

Many shipbuilders have already had to give up all their private work and turn all their energies to the building of war craft, but in their cases the danger of diversion of trade was not considerable, for all yards able to build big ships were in the same position. Still the hardship was a real one. I know of one case where the yard had work to the value of $1,500,000 on hand when the yard was virtually commandeered for war. As a result the shipbuilders have not been able to draw any money for these ships under construction, and so they have had to finance that $1,500,000, which at 5 per cent. means $75,000 for one year of the war. This is one of the arguments of the armament makers when it is proposed to limit their profits

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The large, Clyde-built, twin-screw steamer "Huronian," which was launched during May.

to a certain percentage. Undoubtedly points like these will have to be considered, but in the cases of big firms used to Government work there will not be much difficulty, and indeed the shipbuilding firms, I am told, are willing to accept any arrangement that the Government may decide upon for limitation of profit, but the explosive shell question brings in many firms that are new to Government work, querulous about Government inspection, and suspicious how their competing firms will behave. But the time has come when the heads of firms, many of whom have given sons to the war, will be asked to show a sacrifice in the conduct of their business, and this is asked of their shareholders too. The one action is as necessary for the existence of the nation as the other.

Freights and Commerce.

The opinion among influential merchants here is that the prime costs of British manufactures may be maintained, and in many instances advanced during the remainder of the year. It is thought, however, that there should be a substantial reaction in the present level of freights, on the ground that, without some encouragement of that sort, shippers will be disinclined to commit themselves to large transactions for forward delivery. The shipping fraternity would seem to be amply covered for all their contingencies by the present rates of freight, and substantial relief in that direction within the next six months appears inevitable, especially on the Atlantic routes. I am told that there is a tendency in export circles to make forward contracts for 1916 deliveries in order to fix the raw material, but that there is less disposition to book the freight ahead, except in cases where the shipowner is prepared to give to the shipper the benefit of any fall that may occur in freights before the end of the year.

Re-Establishing the Eastern Mail Route.

The re-establishment of the overland route for mails to the Far East, which began early in June, has given unqualified pleasure in commercial circles here. It means the saving of a fortnight on the round voyage, and, in view of the considerable expense of cable correspondence, for which the Postmaster-General has secured no relief, this fact is of great moment in its bearing upon British trade east of Suez. The pre-war conditions are not fully restored, owing to the difficulty of dealing with the mail service from Brindisi, but letters posted on Thursday will reach Bombay simultaneously with the mail leaving London the previous Friday, and an important detail is that the sample post is made up on Wednesday. The arrangements for the safety of the mails when traversing the Mediterranean will follow the Admiralty regulations hitherto enforced when the mail packets proceeded through the Straits of Gibraltar. There are indications that the passenger lines which convey summer visitors to London home again to India and Australia will be fully patronized during the autumn months, and that normal conditions in that respect will be virtually restored when the second year of the war begins.

Sydney to London in Twenty-Four Days.

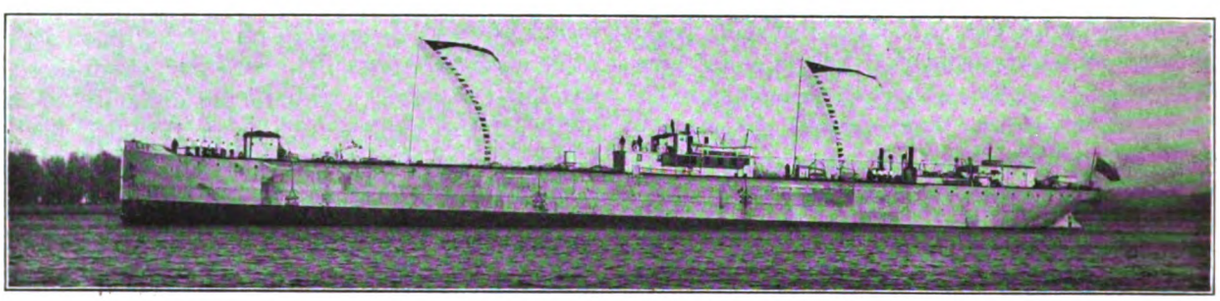
I learn that the Government of New South Wales has made proposals to the State Department at Washington for improving the steamship service between Australia and America. Incidentally this would shorten by a good deal the voyage between Australia and Great Britain. The proposals include a joint subsidy for an accelerated service between Sydney and San Francisco, which would shorten the journey across the Pacific by three or four days, and a rapid mail train service across the American continent to link up with the fast Atlantic steamships to the United Kingdom. This would enable the Australian mails to reach London in about 24 days. I hear that the proposal has not been accepted by the Commonwealth

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Government. The suggestion, I believe, came from the New South Wales Trade Commissioner in the United States, but the Australian authorities continue of the opinion that so far as the European mails are concerned, the Suez route is for various reasons preferable. The Federal Government has a contract with the Orient Line, while the British Government has an agreement with the P. and O. Company, and it will be some time yet before the two arrangements come to an end. By that time it is hoped that the two concerns will run speedier vessels, which, of course, they would do in return for an increased subsidy, and, on the other hand, the completion of the new transcontinental railway would considerably accelerate the transport of both passengers and mails between Fremantle and Sydney.

New Cargo Steamer Launched.

Recently the large twin screw steamer "Huronian," which I illustrate and which was built by David & William Henderson & Co., Partick, Glasgow, to the order of Frederick Leyland & Co., Liverpool, underwent her trials on the Firth of Clyde. This addition to the already large fleet of vessels owned by Leyland is 491 feet long over all by 58′ 3″ broad by 32′ 3″ depth molded, with a gross tonnage of about 8,800 tons, is classed in Lloyds 100 A-1, and fulfils the requirements of the Board of Trade for their Passenger certificate. She is rigged as a four-masted schooner and has an exceptionally large number of powerful derricks which with 11 steam winches provide ample means for the rapid handling of large cargoes. Comfortable accommodation is provided on shelter deck amidships for passengers, also for officers, engineers, etc., while the petty officers and crew are berthed in houses on the shelter deck. The machinery, which has been constructed by the builder consists of two sets of quadruple expansion engines having cylinders 22½″, 32¼″, 47″ and 67″ diameter by 48″ stroke, with steam from two double- and two single-ended boilers at 215 pounds pressure.



Shipping Notes

The Japanese Government is putting through the upper and lower houses of the Diet its latest four-year subsidy schedule. The amounts carried for the fiscal year 1916-1917 are: European Line, $902,331; North American Line, $1,468,608; South American Line, $148,184, and Australian Line, $86,556.

The Federal Quartermaster's Department at New York has ordered twelve Lundin housed powered lifeboats from the Welin Marine Equipment Company.

On June 29th, Harlan and Hollingsworth launched the new Ferryboat "Fort Lee," built to the order of the Fort Lee Ferry Company.

The Newport News Shipbuilding and Dry Dock Company is now employing 5,500 men on full time and has on hand about $20,000,000 worth of new contracts.

The Fore River Shipbuilding Company has launched four submarines for the British Government during the past two months. As these under water craft cannot be delivered until the close of the war it is evident that the Fore River yard is pressed for berth space. A recent contract secured was from the Cuban Distilling Company for a molasses carrier of 2,500,000 gallons cargo capacity.

The William Cramp and Sons Ship and Engine Building Company is to be congratulated on securing the services on its Board of Directors of Mr. Andrew Fletcher, President of the W. & A. Fletcher Company of Hoboken. The Fletchers have been intimately connected with the highest development of marine engineering in the United States for many years.

"Has the opening of the Panama Canal resulted in the withdrawal of traffic through the Suez Canal?" Official figures giving the traffic through the Panama Canal during the first six months of commercial operation and details of the navigation through the Suez Canal for the entire year of 1914 which have just come to hand enable the making of comparisons and an analysis of the traffic on both waterways.

For years students of the Panama and Suez Canals have asserted that the opening of the Panama Canal would bring about a steady and

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large withdrawal of traffic from the Suez Canal. During the six months of operation of the Panama Canal a total of about 496 vessels used the waterway, whereas the normal monthly navigation of the Suez Canal is slightly in excess of 400 vessels.

The following comparative table gives the number of vessels using the Panama and Suez Canals for the months of August, September, October, November, and December:

	Panama		Suez.	
	No.	Net Tonnage.	No.	Gross Tonnage.
August	24	106,258	250	1,402,864
September	57	322,038	328	1,721,195
October	84	420,357	479	2,635,446
November	92	448,801	370	2,625,446
December	99	489,915	397	2,451,424

An analysis of the traffic through the Panama Canal for the six months of commercial operation ending on March 1, as prepared by the Canal officials, is as follows:

U. S. coastwise, eastbound	97	499,439
U. S. coastwise, westbound	109	493,272
U. S. Pacific to Europe	66	444,855
Europe to U. S. Pacific	16	59,516
S. America to U. S. and Europe	69	378,386
U. S. to Europe and S. America	31	128,922
U. S. Atlantic to Far East	48	287,782
Far East to U. S. Atlantic	2	14,500
Miscellaneous routings	13	60,572
Vessels without cargo	45	———
Total	496	2,367,244

Panama Canal authorities assert that the above analysis of the six months' traffic shows that the steamers bound to and from the Far East make up most of the tonnage which has been withdrawn from the Suez Canal traffic, although to a certain extent the traffic between Europe and the Pacific formerly utilized the Suez Canal.

The resignation of Henry R. Mallory as president of the Atlantic, Gulf and West Indies lines, and the four operating companies, has been followed by the election of Harry H. Raymond as president of the Clyde and Mallory lines, Alfred G. Smith as president of the Ward line and Franklin D. Mooney as president of the New York and Porto Rico line. Henry R. Mallory has severed his active connection with the Atlantic, Gulf and West Indies Steamship lines. He retires as president of the system, and Galen L. Stone, for several years vice-president, has been elected as president.

A recent sale of stock in the Cramps shipyard at Philadelphia removed the last connection of the Cramp family with the firm. The Cramp shipyard is in its eighty-fifth year, being founded in 1830.

The sale of four of the Erie Company's fleet of eight Great Lake steamers has been announced. The vessels were disposed of to New York parties and two of them will engage in transatlantic service and two in some coastwise trade. The sale was forced by the peculiar decision of the Interstate Commerce Commission that all railroads had to dispose of their Lake steamers by December 1st. About fifty vessels are affected by this ruling. The four craft sold by the Erie were cut in half and sent through the Welland Canal in sections as they were too long for the locks. The halves will be rejoined at Montreal.

The entry of the Nippon Yusen Kaisha, or Japan Mail Steamship Company, into the Far East trade from the eastern seaboard of America that has been talked about in shipping circles for some time it is expected will shortly be announced.

The plan is to establish early in August a monthly service from New York and the eastern seaboard of America to Vladivostock, China and Japan, via the Panama Canal, with a magnificent fleet of new and fully equipped twin-screw steamers of about 10,000 tons dead weight capacity each. The steamers to be placed in the service comprise: "Toyooka Maru," "Takata Maru," "Tokuyama Maru," "Tokohashi Maru" and the "Tsushima Maru."

The $25,000,000 dock project of Philadelphia is now under way. The ten municipal piers which will be known as the Moyamensing piers are planned to outstrip anything in the United States.

Considerable interest is being displayed in the latest Russian motor ship, the "Varjag," which is being built in Gothenberg, Sweden, for Nobel Brothers of Petrograd. The "Verjag" is 368′-0″ long, 354′-6″ between perpendiculars and 55′-0″ beam. This vessel is driven by two 1650 brake horse power, six cylinder, Polar Diesel engines of the two-cycle type. A departure has been made, however, from the usual Polar practice in that separate scavenging pumps will be employed, ports in the bottom of the working cylinders being used for this purpose as in former engines.

The new steamer building by the Fore River Shipbuilding Corporation for the Luckenbach Steamship Company will be 437 feet long by 57 feet beam and will be the first commercial boat of large size to be built in this country with a cruiser stern.

The Galveston Dry Dock and Construction Company, Galveston, Tex., has applied to the Galveston authorities for a fifty-year lease of a 600-foot water frontage as a site for a marine railway, dry dock and shipbuilding plant. The concern agrees to expend $100,000 within two years and $150,000 within five years if the lease is granted.

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The "Arna," a big Maple Leaf freighter, lying at the first Prince Rupert wharf.

Prince Rupert Forging Ahead

THE accompanying illustrations give an idea of the extensive preparations which the port of Prince Rupert is making to enter the ship-repairing and ship-building field in the Pacific Northwest.

The 50-ton pier derrick of the Prince Rupert Drydock and Ship Repair plant has been completed and tested and is now ready for handling heavy shipments up to 50 tons direct from the cars of the Grand Trunk Pacific Railway to steamers, for shipment along the Coast and to foreign ports.

This derrick has an outreach of 40 feet beyond the edge of the pier, and with this outreach the top block is 100 feet above the water. The derrick is carried on massive concrete foundation, supported by concrete piling driven to rock. The design is by Mr. Augustus Smith, President of the Bergen Point Iron Works, Bayonne, New Jersey.

The hoisting tackle is eight parts of 7/8" wire rope wound by a Lidgerwood winding engine operated by a General Electric Co.'s 52 H.-P. electric current motor. The racking in and out is by steel screws 6" in diameter, operated by a separate electric motor. This derrick is the largest in capacity of any on the Pacific Coast of British Columbia, and will be a great aid in handling heavy shipments from rail to water.

The Shipbuilding Shed, shown in one of the pictures, has now been completed about a year, and there has been built under it eight of the twelve pontoons to be used for the Floating Dry Dock. The average time required to build four of these pontoons before the shed was completed was 99 days. With the completion of the shed, the remaining 8 were built in an average of 74½ days. Two of the pontoons are shown in the picture under the shed almost ready for launching and three completed pontoons are shown in the foreground of the picture. To the right there will be seen the electric power plant of 2,000 kw. capacity. This power plant also contains a large steam-driven air compressor and all auxiliary apparatus.

The fourth photograph shows the first section of the dry dock assembled before completion. Since the picture was taken, this section has been completed and tested and found to be satisfactory in every way. The second section, which together with this will give a lifting capacity of 15,000 tons, is to be completed ready for operation by August 1.

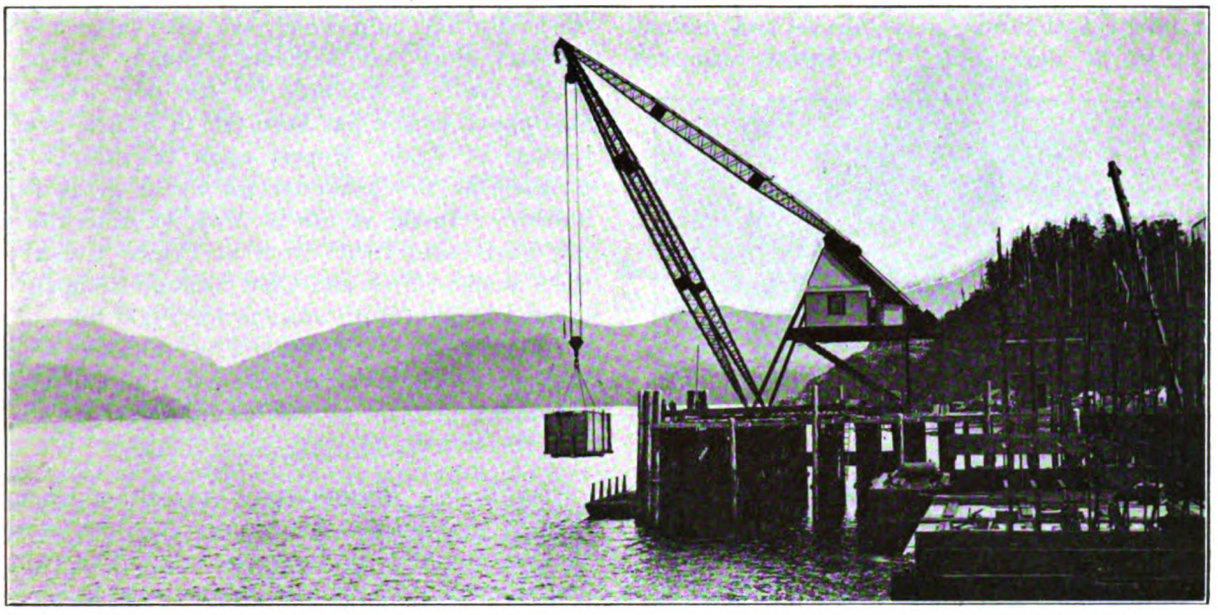
The Machine Shop, Boiler Shop and Foundry are now entirely completed and all tools in place and ready for operation.

This plant may now be considered a factor in ship repair work on the Pacific Coast.

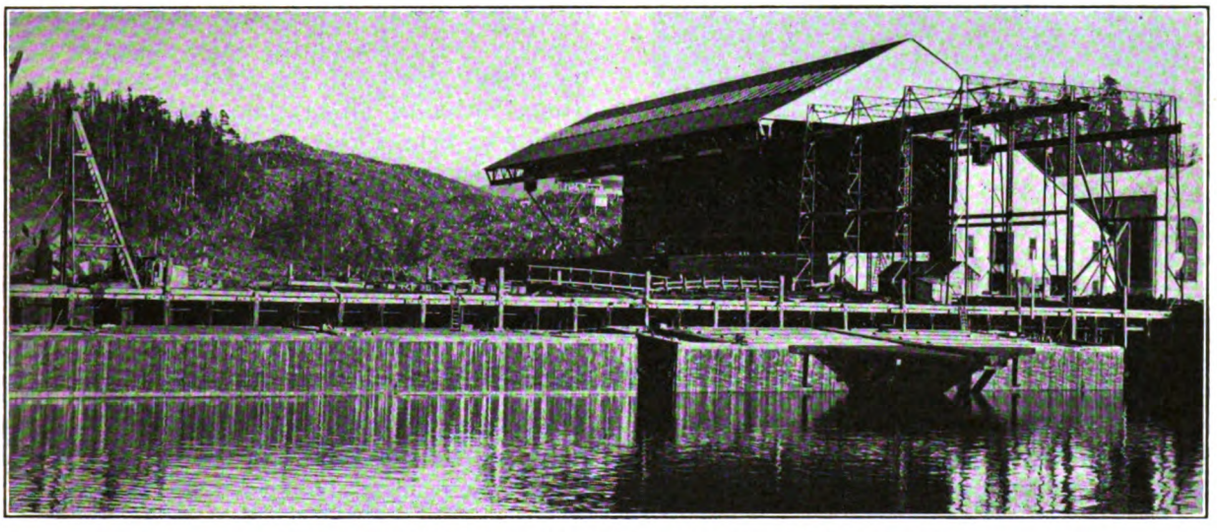
The town of Prince Rupert is situated on Kaien Island between Vancouver and Skagway and is about forty miles south of Alaska's southern boundary. Until 1907, when the Grand Trunk railroad decided to make Prince Rupert its terminal, this part of British Columbia was scarcely known, but during the past seven years the new seaport has grown to 7,000 inhabitants and is still forging ahead despite the deadening influences of the European war.

Aside from being the terminal of a great trunk line, Prince Rupert has a back country possessing

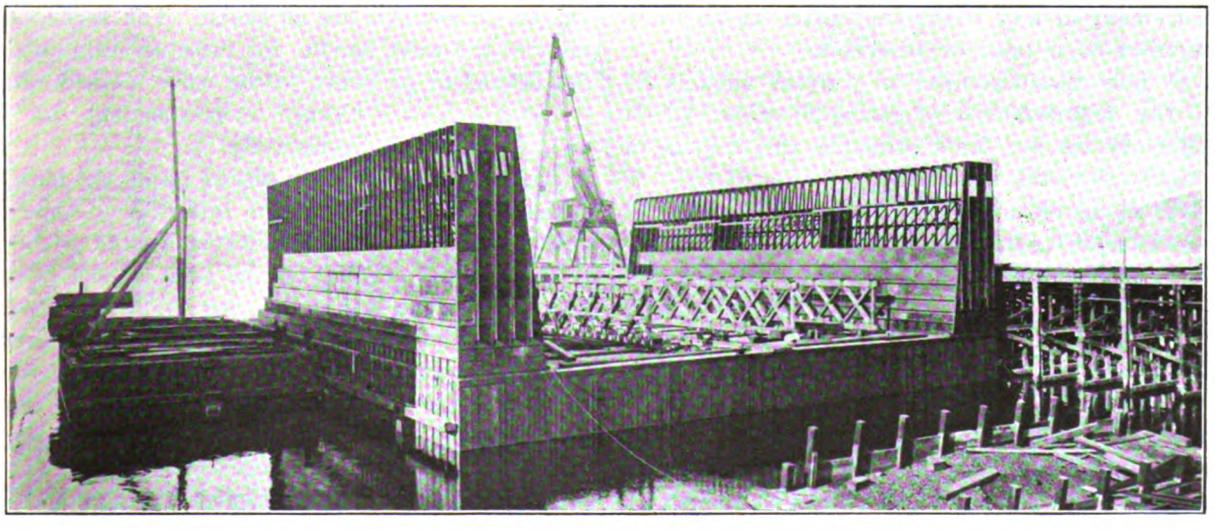
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The crane has an outreach of forty feet, and when in this position the top block has a clear height above the water of 100 feet.



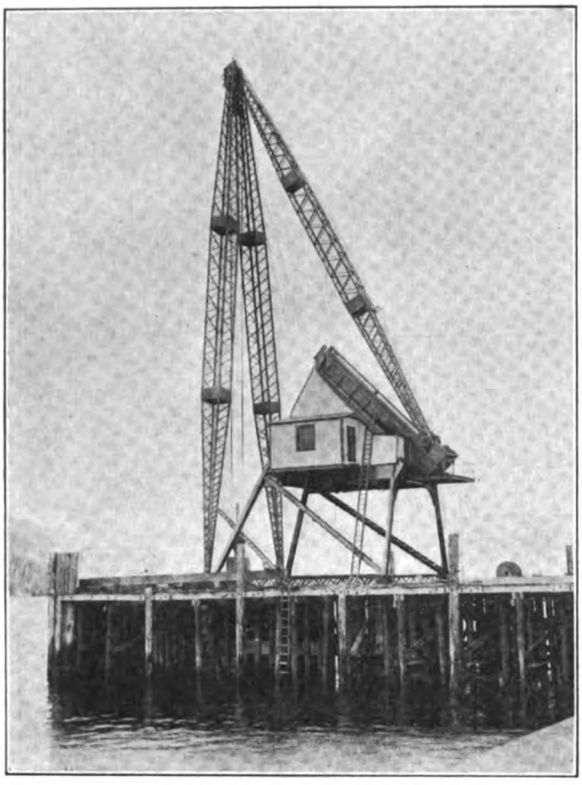
The ship shed of the new building and repair plant at Prince Rupert.



The first section of the 20,000 ton dry dock, shown slightly before its final completion.

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great latent agricultural possibilities and mineral wealth to be developed. The forest resources, especially fine pulp wood, are very large and this industry alone would insure a steady and permanent growth of business for the port. Considerable apprehension has been felt in Seattle over the inroads of Prince Rupert upon the former city's position as the headquarters for a great fishing industry. In the month of May, 46 American fishing boats sold their catch at Prince Rupert and the Canadian Fish and Cold Storage Company has erected a plant with storage for 7,000 tons of fish at a cost of $1,250,000. The railroad recently started to operate three through trains a week to Winnipeg in place of two as formerly.



A near view of the 50-ton crane.

The Briggs Bituminous Composition Company secured the contract for coating the steel work of the big pontoons of the new dock. The painting and enameling of material in this case is an index of the careful and thorough nature of all the new work being done on the shipyard and railway terminal. All the material first received a shop coat of Briggs Tenax Bituminous Solution and after erection two coats of the same material. When thoroughly dried out, the interior of the pontoon wings, including all bracing, was finished with a coating of Briggs Ferroid Bituminous Enamel one-eighth inch thick.

The Pneumercator

By HENDERSON B. GREGORY, Associate.

General Description.

The Pneumercator was invented by Mr. Harry S. Parks, of Philadelphia, Pa., with intention of providing an apparatus that would measure the depth and volume of the contents of tanks, reservoirs, etc., with extreme accuracy and register this measurement at any convenient place at any distance from such tank or reservoir.

It is now manufactured in various models to meet the requirements of its application, all of which work on the same principle and consist of essentially the same elements.

These elements are—

(1) A balance chamber;

(2) A mercury gage, which is calibrated in feet and inches and the corresponding weight or volume;

(3) A pump or other means of furnishing compressed air;

(4) A control valve, directly attached to the mercury gage and also connected, through small piping, to the balance chamber and air pump.

By placing the handle of the control valve in its various positions, connection is made exclusively, (*a*) between the balance chamber and the air pump, or (*b*) between the balance chamber and the gage, or (*c*) the reading of the mercury gage can be returned to zero without losing the pressure then existing between the balance chamber and the mercury gage. There is a fourth position (*d*) in which the various connections are all closed. The various positions of the valve handle, for these several functions, are defined by an index on the valve marked "Gage" —"Shut"—"Air"—"Vent," corresponding to (*b*), (*d*), (*a*) and (*c*), respectively.

The balance chamber is placed inside the tank and securely attached so that the orifice is at some predetermined point, which point is desired to be the zero or lowest reading on the scale of the mercury gage. The pipe line is then led to the place where the reading of the contents of the tank is desired to be taken and connected to the control valve of the mercury gage. The source of compressed air is then connected to the control valve, whereupon the instrument is ready to be placed in operation, as soon as the liquid to be measured enters the tank and rises sufficiently to cover the orifice in the balance chamber. The position of the control valve should then be at

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"gage." As the liquid rises in the tank it flows into the orifice in the balance chamber until its weight or head compresses the air in the pipe line (which is now sealed at the top by the mercury) so that one balances the other.

The point at which this balance takes place varies with the length of the connecting pipe line, and consequently the accuracy of the reading of the mercury gage cannot be depended upon unless the point of balance takes place *exactly* at the orifice, as the mercury gage will show an error proportionate to the distance at which the liquid *in the balance chamber* stands above the orifice.

It will be readily seen, however, that if the level in the balance chamber where the air and liquid meet is established at the orifice, the mercury in the gage will indicate the true depth of the liquid in the tank above the orifice. Therefore, to accurately set the gage, the control valve is placed in the position marked "air," the connection then being between the balance chamber and the pump. A few strokes of the pump are sufficient to force air through the pipe line to the balance chamber at a pressure in excess of that created by the head of liquid in the tank thereby expelling whatever liquid may be in the balance chamber *above* the orifice.

The control valve is then placed in the position marked "shut," and any excess of air pressure in the pipe line greater than the head of the liquid escapes through the liquid, and the air pressure in the pipe line and balance chamber exactly balances the head of the liquid *at the orifice.*

The control valve is again placed in the position marked "gage," when the air in the pipe line exerts

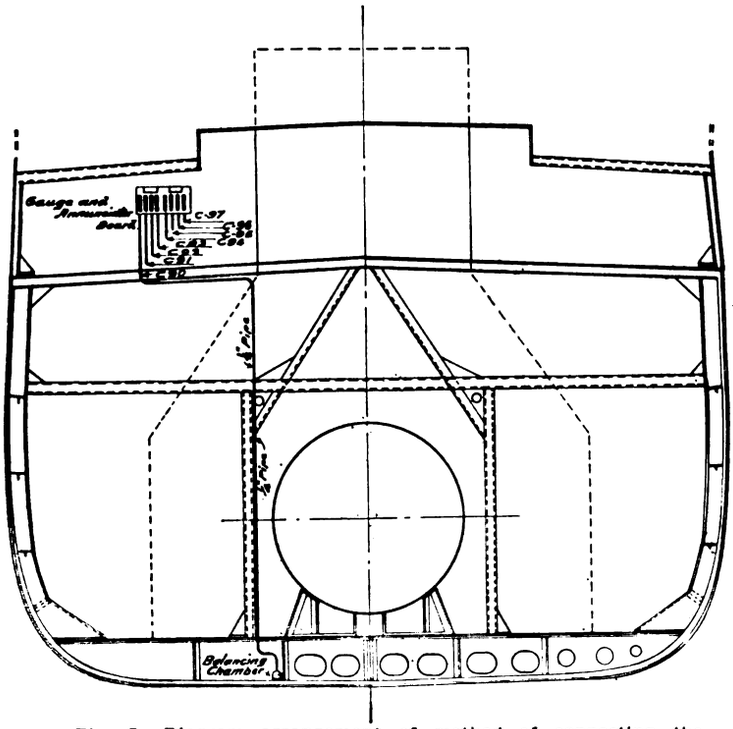


Fig. 5.—Diagram arrangement of method of connecting the apparatus to the inner-bottom tanks aboard ship.

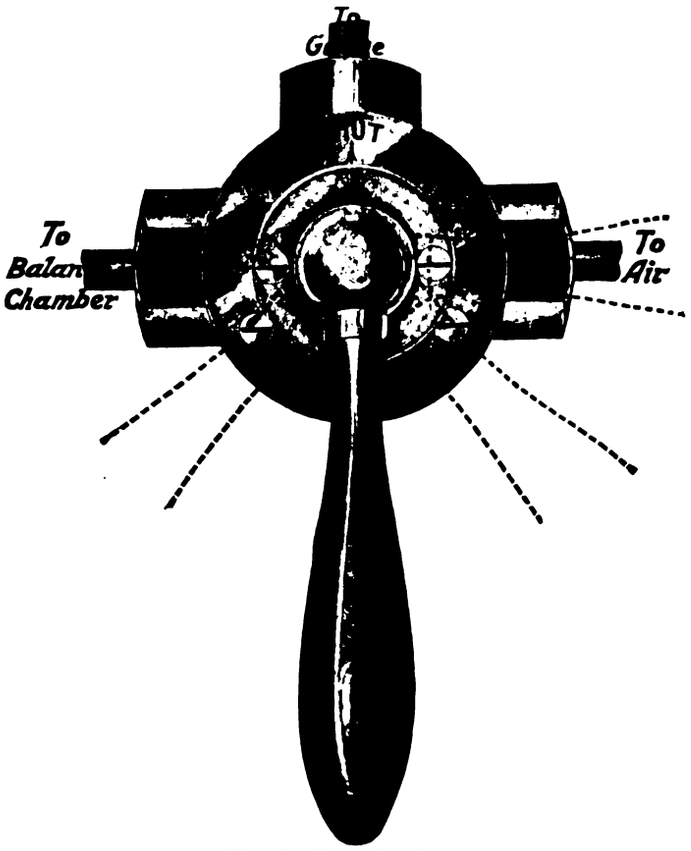


Fig. 2.—Control valve.

its pressure on the mercury so that the latter rises to a height sufficient to balance the air pressure, thus indicating the depth of the liquid in the tank above the orifice or zero point. As the tank is filled the mercury continues to rise in direct ratio to the head of the liquid.

As the indication is effected through pneumatic pressure of a gas of which the weight is negligible, the indicator may be located below the body of liquid as well as above it and will show an equal degree of accuracy regardless of the length or direction of the connecting pipe line.

The apparatus may also be used when the pressure in the tank is greater or less than atmospheric as well as under atmospheric pressure. In such cases the upper part of the tank is connected by an additional pipe line with the top of the mercury tube. This pipe line carries the pressure or vacuum as the case may be; and the usual pipe line, the pressure or vacuum plus the head of the liquid, and both the liquid to be measured and the mercury column being exposed to the same pressure, the indicator registers the head *only*. Of course should there be a leak in the pipe line between the balance chamber and the control valve or in the control valve itself, the pneumatic pressure caused by the head of the liquid would escape and the mercury gage would give a false reading, therefore it is well to re-establish the true head by means of the pump or other air supply from time to time as the tank is being filled or emptied.

In case the instrument has not been read for some

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time it is always advisable to "blow out" the system to see if any leak has occurred; if after this is done and the control valve returned to "gage" position the reading is the same as before, no further test is necessary, but if the second reading is less than the first, the control valve should be placed in the "vent" position; this allows the pressure on top of the mercury in the mercury cistern to escape and the mercury (then being under atmospheric pressure) returns to zero. The control valve is then turned to "gage," and if the mercury rises to the same height as it did first, after "blowing out," these readings are the correct ones.

By these two means the instrument in itself provides a positive check of its accuracy.

Installation on U. S. S. "New York."

The Pneumercator was first brought to the attention of the Navy Department early in the year 1913, and, following a test of its accuracy conducted at the Navy Yard, New York, the results of which aroused considerable interest and speculation, an installation was authorized on the battleship "New York," for a practical trial aboard ship under service conditions, in connection with the fuel-oil tanks.

The fuel oil on the "New York," which is intended only for auxiliary service, is carried in eight double-bottom tanks of various sizes and depths.

A balance chamber was installed in each tank, from which a ¼-inch outside diameter lead pipe was led through an oil-tight connection in the tank tops, from which point a copper pipe of the same size was carried to the engineers' office on the gun deck of the vessel.

The indicating gages were mounted on slate boards attached to the athwart-ship bulkhead.

A connection was made from the ship's compressed-air line, through a reducing valve, to two needle valves mounted on the boards, which in turn admitted the air to the control valve of each instrument and a pressure gage connected with the air line to register the air pressure available.

The scales of the mercury gage were calibrated on one side in feet, inches and half inches, and on the other in the corresponding gallons of oil at 60 degrees F., temperature. At the suggestion of the manufacturer an annunciator was mounted on each board which showed a signal and rang a bell when each tank was filled to the 95 per cent. full point.

This type of instrument is shown in Figs. 6 and 7, and is now installed on the battleship "New York."

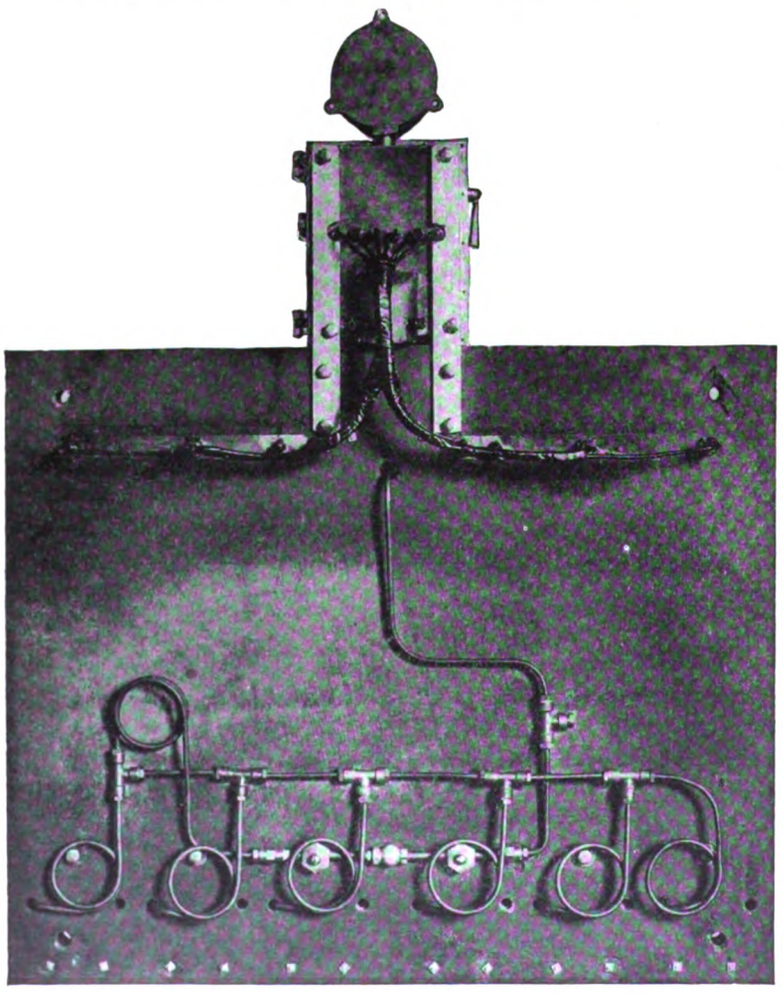


Fig. 6.—Rear view, Model T-I, Navy Type, showing electric wiring at top necessary for operating high or low alarm.

The instrument can also be arranged to operate an annunciator when the tank is emptied to some predetermined point.

The results obtained by the installation on the "New York" are most gratifying. Not only has it been possible to ascertain, with accuracy and at all times, the quantity of fuel oil in the various double-bottom tanks, but a record of the oil burned on any run has been readily obtained, and with a degree of accuracy heretofore impossible, by merely taking the difference of the gage readings at the beginning and end of the run. Reports from the vessel on the operation of the instrument pronounce it entirely satisfactory.

Draught Indicator for Vessels.

Another application of the pneumercator is that of measuring the draught of vessels. This instrument has not as yet been tested by the Navy, but the reports received from the owners of various merchant ships in which it has been installed are so interesting that a brief description of the instrument and its operation seem desirable.

In this type of instrument, the balance chamber is placed in a casing, which in turn is connected with the sea itself by means of a 1-inch sea valve. Two balance chambers are used, one forward and the other aft, the sea connection being installed

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below the light draught trim of the vessel. The ¼-inch copper tubing is then led from the balance chambers to the captain's office or the chart room and connected to the registering portion of the instrument in the same manner as in the T-I type of instrument, Fig. 7, previously described.

In referring to the Pneumercator system on the U. S. S. "New York," Mr. H. B. Gregory states on page 40 of the Journal of the American Society of Naval Engineers for February of this year:

"The report of the engineering officer, on the operation of the instrument during the first six months of the commissioning of the vessel, pronounces it entirely satisfactory. A careful checking of its readings on various tests aboard the vessel has shown it to be thoroughly reliable. During the recent final acceptance trials, when running the two hours' full-power run, burning oil and coal, the oil was measured by special measuring tanks on deck, which record agreed exactly with the pneumercator readings."

Mr. E. R. Cornbrooks, formerly chief draftsman at the Newport News Shipbuilding and Dry Dock Company, was recently appointed general manager of that concern.

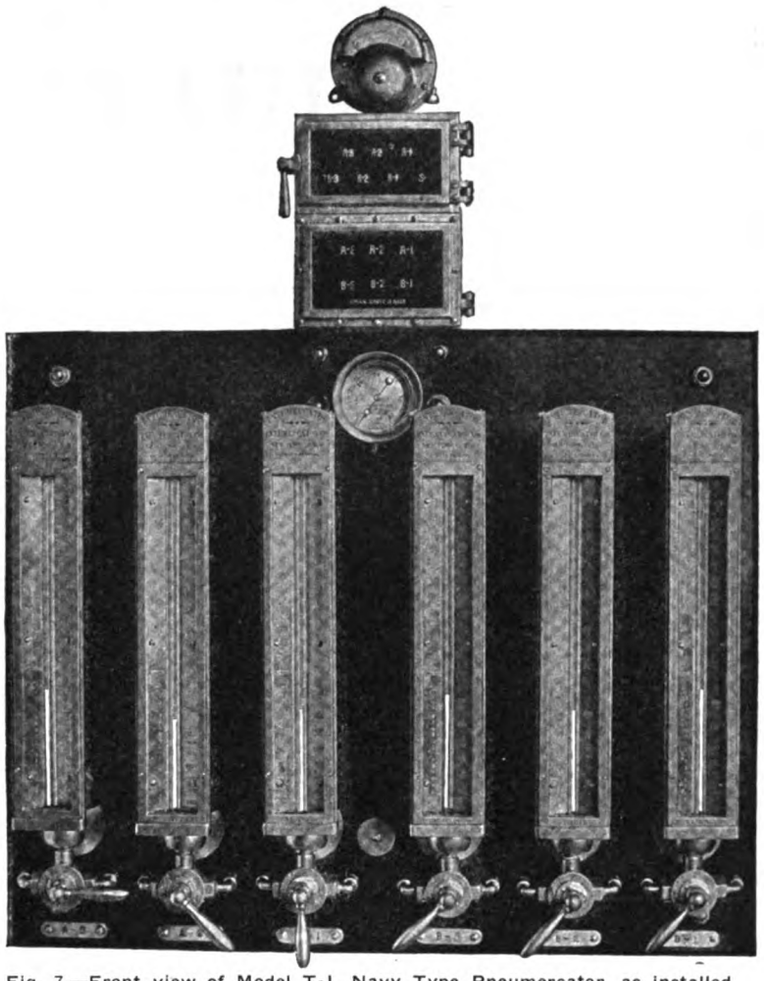


Fig. 7.—Front view of Model T-I, Navy Type Pneumercator, as installed on the U. S. S. "Oklahoma," "Pennsylvania" and "Arizona" and the "E. V. A. Rivadavia."

Constructive Total Loss

THE United States Circuit Court, State of Washington, has recently handed down a decision in connection with a "rider" on a policy of marine insurance which, if sustained, will cause underwriters to exercise the utmost care in drawing clauses to be attached to or written upon the policy itself.

It appears that a certain insurance company issued a policy of marine insurance, known as the San Francisco form of policy, on the schooner "William Nottingham," insuring her for $30,000, on a valuation of $45,000. In the printed portion of this form of policy it is agreed:

"That the insured shall not have the right to abandon the vessel unless the amount which this company would be liable to pay under an adjustment as of partial loss for labor and materials (exclusive of salvage or general average expenses and the cost of funds) shall exceed half the amount hereby insured."

And it also agreed:

"That one-third shall be deducted from the cost of all repairs and losses on the vessel by the perils insured against.....as a commutation for the average difference between new and old."

The policy also provides

"no partial loss or particular average shall in any event be paid under this policy unless amounting to at least.....per cent."

the blank to be filled with whatever percentage may be agreed upon.

And it is also provided in the policy that the perils which the company takes upon itself are of the seas.....and all other losses and misfortunes that shall come to the hurt or detriment of the vessel to which insurers are liable by the rules and customs of insurance in San Francisco .....and the provisions of the Civil Code of California, except such losses or misfortunes as are excluded by this policy.

On the policy issued on the "Nottingham" was a rider or endorsement reading:

"This insurance is against total and/or con-

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INSURES HULLS, CARGOES,
HEAD OFFICE: CALIFORNIA AND SANSOME
JOSEPH HADLEY, European Agent
8 LOTHBURY, E. C.
LONDON
G. KIRKHAM SMITH, Special Agent
407 LEWIS BUILDING
PORTLAND, ORE.
FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

structive total loss of vessel including general average."

and the blank for the percentage in the franchise clause was not filled in.

The schooner, after loading a cargo of lumber at a northern port, proceeded to sea, met with heavy weather, lost her deck load, became water-logged, and was abandoned by the master and crew. She was subsequently picked up and towed into port, later taken to another port where the remaining cargo was discharged and repairs were made.

Claim was made as for a constructive total loss on the ground that the endorsement on the policy nullified the printed conditions of the policy regarding the method of arriving at a constructive total loss, thus bringing into application the conditions of the Civil Code of California. This Code provides that a person insured by a contract of marine insurance may abandon the thing insured when the cause of the loss is a peril insured against if "more than half thereof in value is actually lost, or would have to be expended to recover it from the peril."

In its decision the Court held that the marginal endorsement nullified the printed conditions regarding a constructive total loss, thus bringing in the application of the provisions of the Civil Code. It found that four tenders had been made for the repairs, ranging from a little over twenty thousand dollars to something over twenty-five thousand dollars, and it also found that a statement of general average had been prepared showing the general average and salvage charges to have been about fifty-four hundred dollars. The Court held that the valuation of the vessel as expressed in the policy of insurance was binding as between the assured and the assurer; that the rate of insurance was based upon liability and that the liability of the insurer is upon valuation of the vessel.

In his decision the Judge (Neterer) said:

"In determining whether there is a liability the Court must determine whether the loss occasioned was more than one-half of the payment required under the policy."

And he found:

"In view of what has been said, what is the loss and is the defendant liable upon this policy? The bids received for repair of the vessel range from $20,059 to $25,200. They are four in number. The average of all of the bids is $23,455. The salvage adjustment amounts to $5,399.46, making a total, based upon the average of the bids received for repair, of $28,854. Under the marginal clause the salvage charges and general average are included. This would show a loss of more than one-half of the valuation of the vessel. Under the stipulations of the policy, one-third of the repairs is to be deducted for new and old. Taking the average of the bids submitted on repairs, deducting one-third for new and old, leaves $15,636.67 amount of loss. Taking 30/45 of this, the amount to be paid by the defendant company equals $10,424.44, to which should be added salvage adjustment of $5,399.46, making a total of $15,823.90."

The argument and figures fail to appeal to the ordinary mind. If the bids were bona fide and covered the specifications in full, why take an average of four bids? Certainly an uninsured owner would accept the lowest tender and all calculations should be based on that amount. Further the Court recognizes the binding force of the provisions of the policy as to deducting one-third from the cost of repairs as a commutation for the difference between new and old, and also recognizes the force of the valuation of the vessel as expressed in the policy, and figures the liability of the underwriter, so far as the partial loss and particular average is concerned, as being 30/45ths of the average of the tenders less one-third, and it adds to this amount the amount adjusted as general average and salvage charges, which includes the cost of preparing the statement. In recognizing the validity of the one-third off provision, the Court loses sight of the further provisions in the policy, of exactly the same force, that the cost of docking, caulking and painting is subject to different treatment, and which if fairly computed might show a different result.

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220 BYRNE BUILDING
LOS ANGELES, CALIFORNIA
F. HERRMANN & CO., Managers
ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK
AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

In the course of his decision the Court further says:

"I think that a reasonable construction of the policy must conclude that the endorsement of the policy must have operation. There was a purpose in the minds of the parties at the time the policy was issued, with relation to the conditions contained in this endorsement. It changes the stipulations in the body of the policy materially. They relate to a vital issue which must arise upon every loss under a policy, and all authorities agree that the marginal endorsement must obtain over the written portion in the body of the contract, where they cannot be reconciled, and these having been entered by the party itself must be construed most strongly against it."

The whole question would seem to hinge upon the point as to whether or not the marginal clause cannot be reconciled with the printed conditions of the policy as to what will constitute a constructive total loss. That there was a purpose in the minds of the parties at the time the policy was issued is certain, and that purpose was undoubtedly that the underwriter should not be liable for claims for partial loss or particular average. He was willing to accept the risk of a constructive total loss based on the conditions of the document, and also for general average and salvage charges based on the relation of the amount insured to the agreed value as expressed in the policy, and he named his rate of premium accordingly. In holding that the marginal clause nullifies the clause as to what would constitute a constructive total loss under the policy, thus bringing in the application of the conditions of the Civil Code, it would seem logical that the Code must govern in all things. The Code distinctly provides that an assured may abandon if more than half thereof in value is actually lost or would have to be expended to recover it from the peril. It says nothing about any agreed value and therefore it must mean actual or market value. It says nothing about thirds off, therefore it must mean the gross loss or cost of repairs. If it had been held that the marginal clause nullified the entire provisions of the policy and the provisions of the Civil Code only should apply, then there would be no necessity for going into an elaborate calculation, for the constructive total loss would be established without question. Yet the Court admits the binding force of the valuation as compared with the amount insured for the purpose of arriving at the amount claimable as particular average or partial loss: it admits the binding force of the provision requiring the deduction of one-third from the cost of repairs, at the same time ignoring the provision for certain other deductions from certain of the repairs, and holds the underwriter liable for the amount of general average and salvage charges to be added to the particular average to ascertain if there is a constructive total loss.

A careful review of the policy and the marginal clause show conclusively that there is nothing irreconcilable as between the two. The underwriter has stipulated in the policy what shall constitute a constructive total loss under the policy, and he has agreed to accept that risk. There is nothing antagonistic, but on the contrary the two together make a complete and concise whole.

An appeal has been taken.

The United States light vessel "No. 54," which is equipped with a 100 horse-power Mietz and Weiss three-cylinder, direct reversible oil engine for propulsion and two Mietz and Weiss vertical oil engine compressor units for furnishing the air for pumps, anchor hoists and siren, recently had its acceptance trial run in the presence of the Superintendent of Naval Construction of Lighthouses, W. C. Gillette; Inspectors of the Lighthouse Department J. T. Yates and W. H. Goddard, and Mr. C. W. Weiss, representing the Mietz and Weiss Company. After the trials, which were satisfactory in every way, the vessel proceeded from Staten Island to her station off Boston under her own power.

Wireless sets are to be installed on the lighthouse tenders "Columbine," "Cypress," "Orchid," "Sequoia" and "Manzanita."

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Early California Maritime Cases

By WILBUR BASSETT, Proctor in Admiralty

MANY men with marine interests are surprised to learn that California has a number of Code provisions, usually spoken of as the Vessels Act and contained in the Code of Civil Procedure, which establish many liens against vessels which are not recognized by the general maritime law, and also declare a method of procedure for their enforcement and for the enforcement in State Courts of similar liens existing under the maritime law. There is no maritime lien, for example, in favor of a ship-builder, upon the theory that until the vessel is launched she is not subject to the maritime law, nor was there any lien for supplies at the home port of a vessel, upon the theory that her owners could there be reached and it was not necessary to extend credit at the home port to the vessel herself. These liens are, however, given by statutes in most of the maritime States and the statutes adhere closely to both the right and the remedy recognized in the maritime forums. It may be of interest to sketch briefly the attempts of our appellate Courts to construe the Vessels Act and we shall have occasion to note that not since the passing of the first statutes in 1850 has there been a single decision which has not been overruled, or now stands without support, either in other maritime States or the Federal Courts. The situation is one that calls for the earnest attention of maritime interests, for no matter how vague or misleading a decision may be it always has the force of precedent and may sometime convince us that "black is white."

Upon the admission of the State to the Union, California already had an extensive shipping, but her lawyers were quite uncertain whether the new State should construct its laws out of whole cloth, from day to day, lean leisurely upon the Mexican laws or depend upon the system already provided by the common law in so far as it extended. There were many rabid State-rights men at the bar, and many Southerners upon the bench, who for years struggled against the power of the Federal Courts and attempted to maintain the admiralty jurisdiction in the State Court.

It is interesting to note that when the question was finally settled the opinion of the Supreme Court of the United States was written by Justice Stephen J. Field of California. One of the early cases heard at the first session of our Supreme Court in March, 1850, rose upon an appeal in an action against the bark "Ella Frances," which had been carrying passengers and freight from Panama to San Francisco. The record of the case as reported, is not very full but it appears that several passengers had recovered judgment in what was then known as the Court of First Instance in an action directly against the vessel herself. Summons was served upon the master and there was no other service or pretended service upon the vessel, or any appearance on her behalf. The trial court entered a judgment of sale of the bark and she was sold to one Loring. An inspection of the judgment, however, shows that the sheriff was only ordered to sell the interest of Illsley, the master, who had appeared in the action. The master did not dispute the result of the sale, but contended that, as master, he still had the right to continue in possession. The trial court, however, awarded to Loring, the purchaser, a writ of possession, and it was upon this order that the appeal came to the Supreme Court. It was contended, upon behalf of the master, that the proceeding was in admiralty and strictly in rem and that, therefore, the Court had not jurisdiction. The decision disregards the form of the order to the sheriff and the form of the complaint and holds the action to be a personal one and the sale to be in reality only of the interest of the personal defendant in the vessel. The Court found that the purchaser had acquired the interest of Illsley, but reversed the judgment of the trial court ordering possession to be delivered to Loring on the ground that the master was not deprived by the sale of his right to continue as master and, therefore, still had the right of possession. This interesting case is recorded as Loring vs. Illsley in Vol. 1, Cal. Reports, page 24. The opinion was written by Justice Bennett, who, at the June session wrote the opinion in Selby vs. The Bark "Alice Tarlton." That action was brought in the Mexican Court of First Instance against the "Alice Tarlton" to recover damages for injuries to goods on the passage from New York to San Francisco. Before the cause was tried the Court passed out of existence, and upon the organization of the District Court the cause was transferred to it for trial. Judgment was given for libelant and the Court tacked on to the cost bill an item of $600.00, counsel fees, upon the theory that such allowance was proper because the case was in admiralty where counsel fees may properly be allowed. A few months before this opinion was written the Legislature had enacted the statute of February, 1850, organizing courts and judicial procedure and adopting the common law. The judiciary act of Congress, under which the Federal Courts were organized and their powers defined, was passed in 1789, but Judge Bennett, evidently, did not take its provisions very seriously for he says, "Whatever may have been the

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powers and jurisdiction of courts of First Instance, it is clear that the district courts have none beyond what has been conferred upon them by the statutes of this State. The Legislature, in adopting the common law, by the act organizing the district courts and by the act prescribing the practice therein, has defined the limits of the powers and jurisdiction of district courts; and I do not find in either of those acts anything which countenances the idea that the Legislature has vested the district courts with the power of a court of admiralty, or has authorized them to allow a counsel fee, in addition to the regular taxable costs, on the dismissal of a complaint." It is apparent that the Supreme Court thought that the Legislature of the young State might in its discretion invest the State court with admiralty jurisdiction, but that it had not yet done so. But the question was soon presented by the Act of the Legislature of April 10, 1850, which was the first act passed in regard to claims against vessels and the prototype of our present code provisions. Judge Bennett had an opportunity at the very next session of Court, held in December, 1850, to entertain an appeal from a judgment brought under this Act. The action was Souter vs. The "Sea Witch," 1 Cal., 162. The statute enacted that "Every boat or vessel used in navigating the waters of this State, shall be liable to be proceeded against by attachment as set out in the statute."

The "Sea Witch" was a clipper ship in the China trade. Judge Bennett says in his decision that the statute plainly was intended to cover only vessels which were engaged solely in traffic upon the rivers within the interior. "And such we doubt not was the intention of the Legislature. They meant by these words to limit the operation of the act so as to avoid conflict between the State and Federal authorities as to jurisdiction of actions concerning maritime contract and maritime torts." The Court then cites the decision in the Phoebus, 11 Peters, 175, in which the Supreme Court of the United States, influenced by the decisions of the English Courts, held that vessels engaged in commerce on the Mississippi were not within the jurisdiction of the admiralty. It is interesting to note that apparently at no time did the Supreme Court nor Judge Bennett sense the effect of the Federal judiciary act or the difference between jurisdiction and procedure as affected by that act. The act vested admiralty jurisdiction exclusively in the Federal Court, saving to suitors such remedies as the common law was competent to give. Judge Bennett, however, expressly says that "the procedure laid down in our first Vessels Act" was not one known to the common law, and a glance at the statute shows that it was an act authorizing a proceeding directly against the vessel by name and not depending for its validity upon any personal service. At the same term of court an appeal was presented in the case of Fay vs. The Steamer "New-World," a river steamer which, in the course of a gratuitous carriage of gold dust for certain Sacramento pioneers had lost the same somewhere on the way to San Francisco. Neither court nor counsel questioned the jurisdiction of the Court and the case went off upon other points. The decision was written by Justice Lyons.

The next decision of the Supreme Court under the Vessels Act was Innis vs. The Steamer "Senator." The plaintiff seems to have been the owner or master of a sea-going sailing ship, the "Rhode Island," which was lying at anchor in the Bay and was run into and injured by the steamer "Senator." Judgment was entered against the vessel and apparently neither court nor counsel questioned the authority of the Court to enter such a judgment. Up to this time no questions of admiralty procedure had been discussed, but it was inevitable that that Court must sooner or later decide flatly the question whether it would assume admiralty jurisdiction or proceed upon some theory of its own. The act of 1850, to which we have referred, contains provision similar to that of our present Code of Civil Procedure permitting persons having claims against a vessel to appear by intervention and file their claims as in courts of admiralty, and have all of the various liens satisfied in one action. The statute in the meantime had been carried over into the code known as the Practice Act and its terms came up for construction at the July term in 1852, in the proceeding brought by A. J. Averill against the steamer "Hartford," reported in 2 Cal., 308. The proceeding, as its name implies, was one directly against the vessel and the opinion is written by Justice Heydenfeldt. It is so short and so full of inconsistencies that we give it in full:

"The sixth chapter of the Practice Act, providing for actions against steamers, vessels, and boats, confers upon the District Courts admiralty jurisdiction pro tanto, and the proceedings in such actions must be governed by the principles and forms of admiralty courts, except where otherwise controlled or directed by the act.

"The rule in regard to actions in rem, in both admiralty and common law courts, gives exclusive jurisdiction in a given case to that tribunal which has acquired it by a judicial seizure of proceeding in rem. Our statute, however, alters that rule. It makes the service of process upon a person standing in a particular relation to the thing equivalent to its seizure, for the purpose of conferring jurisdiction; and it necessarily follows, that jurisdiction in rem may exist in several courts at the same time and over the same subject. If this position appears an anomaly, it is one created by the omnipotent power of legislation.

"There need, however, be no conflict of jurisdiction. The Court whose mesne or final process has made first actual seizure of the thing, must have exclusive

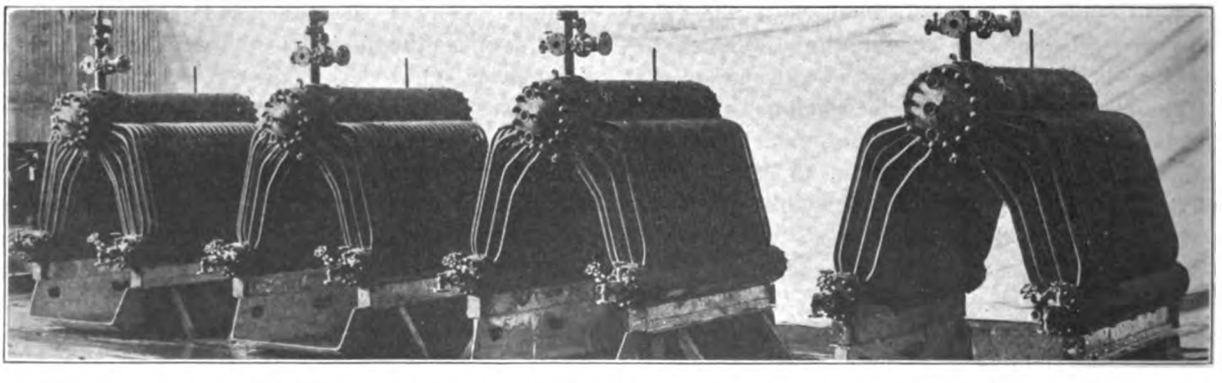
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power over its disposal, and the distribution of the fund arising therefrom. The judgments of other Courts, where properly authenticated, and filed in the Court having custody of the fund, must be regarded as complete adjudication of the subject-matter of litigation which they disclose, and entitled to distribution according to their respective merits. This construction is totally independent of the provisions of Sec. 329 of the act. That is intended to provide a summary mode of determining claims of a particular class, which have not been adjudicated by a competent tribunal."

We may well imagine the consternation with which this decision was greeted by shipping interests in California. The Federal Judiciary Act of 1789 had never been questioned or defied before this time, yet our Supreme Court had no difficulty in saying that the Practice Act conferred admiralty jurisdiction upon the State Court in spite of the expressed provision of the Federal Act. But as the Federal Act is not expressly referred to in the opinion, and such reference would raise a question of grave importance, we may charitably assume that the Court did not have that Act called to its attention. There are other statements in the opinion, however, which are little short of astounding. The effect of the decision was so sinister and so far-reaching that even today it has modified and warped the decisions of our Supreme Court. The opinion says that seizure has always been held essential to a proceeding in rem, but that the statute had changed this rule by providing for substituted service upon an individual. That such service cannot bar the right of any person not served is, we think, too elementary to need discussion. Here was a statute intended to be parallel to admiralty procedure and as the Court says, intended to confer admiralty jurisdiction upon the State Court, and yet the Court, admitting that possession is necessary to jurisdiction in rem, ignores the fact that, even in admiralty it is customary in addition to the seizure of the vessel to order service in the form of a citation to be given to the master or other person in charge, as a matter of courtesy and convenience. Such service upon any person in a proceeding against a vessel is a mere detail of procedure. The jurisdictional service in the action is had upon the vessel itself. Benedict says, "This is necessarily notice to all those who have any interest in the thing and it is reasonable because it is necessary, and because it is the part of common prudence for all those who have any interest in property to guard that interest by persons who are in a situation to protect it. Every person, therefore, who can assert any title to a vessel has constructive notice of seizure and can fairly be considered as a party to the libel."

This was already old and established law at the time of the decision in Averill vs. The Steamer "Hartford." The Supreme Court of the United States had often discussed the question, and in Hollingsworth vs. Barbour, 4 Peters, 474, said of the lack of personal service in admiralty: "The course of proceeding in admiralty causes, and some other cases, where the proceeding is strictly in rem, may be supposed to be exceptions to this rule. They are not properly exceptions. The law requires the seizure of the thing as constructive notice to the whole world, and all persons concerned in interest are considered as affected by this constructive notice." Chief Justice Marshall in the "Mary," 9 Cranch., 126, says: "Every person, therefore, who could assert any title to the "Mary," has constructive notice of her seizure and may fairly be considered as a party to the libel." This being the law in admiralty, Judge Heydenfeldt blithely states that our statute in providing for that notice to the person in charge of the vessel which had always been customary in admiralty had thereby altered the rule and dispensed with the necessity for seizure of the vessel. He, therefore, concluded that there may be jurisdiction in several courts at the same time and that if this is an anomaly "it is one created by the omnipotent power of legislation." We prefer rather to look upon it as one created by the omnipotent power of judical legislation, for the Practice Act of which he was speaking was adopted from the New York Code, which was based directly upon admiralty procedure and has always been construed as parallel to that procedure.

(Continued in September issue.)



A battery of Seabury boilers recently completed for the U. S. Navy Department

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With Those Who Do Things

NEW TYPE NAVY BOILER.

The eight boilers recently purchased by the Navy Department under Navy Schedule 7865, class 141, have been delivered after passing every test, and are illustrated herewith before assembling, with the casings.

These boilers of the "Seabury" Safety Water Tube type, are to operate under 165 pounds steam pressure, though a hydrostatic pressure of 500 pounds was successfully applied.

The boilers are of the following dimensions: Length of casing 4 ft. 3½ ins., width 4 ft. 4 ins., height, including ash pan 5 ft. 6½ ins., grate surface 12.5 sq. ft. and heating surface 240 sq. ft.

The upper or steam drums were of 15 inches outside diameter, lap welded steel pipe, ½-inch thick and the lower or mud drums were of the same material, 8⅝ inches outside diameter, and 5/16 inches thick.

The generating tubes were of 1-inch O. D., No. 12 B. W. G. of seamless drawn steel cold bent to shape.

The boilers were fitted with flanges, in accordance with the Bureau of Steam Engineering Standard Flange List No. 8-A, and complete with fittings and casing, weighed each, dry, 3,800 pounds.

The Charles L. Seabury & Company, of Morris Heights, New York City, were the builders.

ANOTHER SAILING SHIP WITH "BOLINDER" MOTOR.

The four mast steel bark "Fingal," owned by the Trans-Atlantic Motor Ship Company, left Framnaes Machine Works Tuesday, June 8, 1915, on a trial trip, having had installed two "Bolinder" motors of 160 B.H.P. each. The trial trip went off excellently in every respect and the results exceeded all expectations. The ship was brought up to 7.5 miles speed against a very fresh breeze.

This result with 320 B.H.P. is most astonishing, because the "Fingal" is a ship of 2435 tons net register and is heavily rigged, and besides she had 1500 tons ballast on board. The motor ran immediately after being started and absolutely no vibration whatsoever was noticed. The motor worked very easily. From full speed ahead to full speed astern took only seven seconds time.

The machine is placed quite aft in the run so that the most forward engine-room bulkhead is located by beam No. 20. The engine-room takes up very little space, 3 to 4 per cent. or something like that. The silencer is placed so that the working of the machine can scarcely be heard. This and the total absence of vibration shows that Bolinder's as well as Framnaes' Works had delivered solid, trustworthy work in both motors and installation. The installing of the motors was begun on the 25th of May and was finished in four days. The engine-room was exceedingly neat and very practically finished.

The oil tank can take sufficient oil for forty days' constant work. The consumption of oil for both motors together is 1.5 ton per 24 hours. The "Fingal" loads 3900 tons and was built in Belfast of steel, in 1883.

Thousands of visitors have admired the beautiful furniture in the reception hall of the California Building at the Panama-Pacific International Exposition which was presented by Mrs. Phoebe A. Hearst. In order to conform with its beautiful setting and to be appropriate to the California Building, this furniture is made from California Laurel. Laurel is a very beautiful native hardwood which was formerly used to a great extent for furniture, billiard tables and cafe fixtures, but



WHITE BROTHERS

HARDWOOD LUMBER
FLOORING
VENEERS
PANELS
ETC., ETC.

FIFTH AND BRANNAN STS.
SAN FRANCISCO

INDIANA BENDING OAK - TEAK - ASH
WHITE CEDAR - IRON BARK - MAHOGANY
LONG OAK KEELS
EASTERN WHITE AND RED OAK, ETC.

WYBROLITE WATERPROOF VENEER PANELS

THE LARGEST STOCK OF HARDWOODS IN THE WEST

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for a number of years has been superseded by the vogue of mahogany and oak.

The pieces which excite the most attraction are the four serving tables and settees which surround the large magnificently carved table in the center. This center piece is twelve feet square and the entire set is done in the antique finish which finds so much favor at the present time. Vickery, Atkins and Torrey were the contractors for these furnishings, and the work itself was executed by the Home Manufacturing Co., the well-known cabinet makers of this city, while White Brothers furnished the lumber.

California Laurel is a wood which has not, for a long time, received its just due as a cabinet wood. Being a native product its price is much less than imported and eastern hardwoods and its hardness and beauty of grain are equal and in most cases superior to any of the other fine woods.

To one interested in fine furniture or hardwoods the Women's Reception Hall in the California Building is well worth a visit.

The Bailey-Drake Company, Atlas Building, 604 Mission street, San Francisco, are now the Pacific Coast representatives of The Ferro Machine and Foundry Company of Cleveland, Ohio. Mr. Edward E. Drake is president of the concern and Mr. Don E. Bailey secretary.

The Bailey-Drake Company will handle Ferro two-cycle and four-cycle marine engines and rowboat motors in California, Oregon, Washington, British Columbia, Alaska and Hawaiian Islands. It will establish distributors, dealers and agents in cities and towns where there are none at present and expects to open a permanent office in Los Angeles with a resident agent to aid in handling the business of that district. The new arrangement will not interfere with other Ferro agents as the engines and motors will continue to be sold on the exclusive agency plan.

The whole territory will be covered at stated intervals by Mr. Bailey and other representatives of the company.

The Federal Composition and Paint Company, manufacturers of marine paints and compositions using the celebrated Von Hoveling processes, has just issued an attractive folder which contains a number of flattering testimonials. A copy of this folder or one of the company's color cards may be had on application to its main office, 17 Battery Place, New York.

The Howard Shipbuilding Company of Jeffersonville, Indiana, recently completed a stern wheel tow boat for the Standard Oil Company. The principal dimensions of this new river craft are 130 by 30 by 6 feet. The hull is constructed entirely of steel.

The latest catalogue of the McNab Company of Bridgeport, Connecticut, makers of Nautical and Engineering Appliances, is given over largely to their "Cascade" Boiler Circulator and Fuel Economizer. The catalogue is of handy size, well illustrated with cuts of various steamers on which the "Cascade" is installed, together with comparative reports of the economy of the boilers before and after installing the circulators. Mr. D. E. Ford, with offices in the Merchants Exchange, San Francisco, is the local agent for these circulators as well as other McNab appliances.

In the 1915 edition of his Marine Directory of the Northwestern Lakes, Mr. Harvey C. Beeson writes: "Certainly all lake marine interests are brighter than in 1914 and improving daily. I predict ore movement of about 40,000,000 tons for the season of 1915 through the Soo Canals. In 1913 it was 48,000,000 tons." Marine men in the Great Lakes district are saying nothing about what this tonnage was in 1914; it's one of those National tooth-aches we're glad to forget—if we can. Mr. Beeson's accuracy in the past justifies our hope that his present prophecy will come near the mark.

The specifications for Lightships "101" and "102" for the United States Government include two 200 horse-power Mietz and Weiss direct reversible marine oil engines and four Mietz and Weiss 50 horse-power oil engine compressor outfits. The decision of the Government engineers in this matter was reached after experience with the Mietz and Weiss engines in lightships "98" and "54." The Union Oil Company of San Francisco has also placed an order for two 75 horse-power Mietz and Weiss reversible oil engines.

The steamer "Kansas City," now being completely overhauled at the Union Iron Works, is to be fitted with two Vertical, Single Style, Double-Acting, Bronze Fitted, High Pressure Atlantic Type Boiler Feed Pumps; sizes—10x6x24 and 11x8x26. These pumps are manufactured by Dean Bros. Steam Pump Works, Indianapolis, Ind., and on account of the design, workmanship and finish, are of the highest quality made. This order was placed through Mr. D. E. Ford, Engineer and Naval Architect, San Francisco, who is agent for Dean Bros. on the Pacific Coast.

EXHIBIT OF THE LAGONDA MANUFACTURING CO. AT THE PANAMA-PACIFIC EXPOSITION.

Among the interesting exhibits at the Panama-Pacific Exposition is that of the Lagonda Manufacturing Co., of Springfield, Ohio. It consists of a most interesting display and illustration of the operation of their boiler tube cleaners, automatic cut-off valves, multiple strainers, and grease extractors.

There are shown the high power direct motor-

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driven tube cleaners for boilers, condensers and economizers, suspended and inserted in condenser tubes and the tubes of a B. & W. manifold, just as they are in actual use, and also types A and B outside and internal dashpot automatic cut-off valves, and the Type C or internal dash pot non-return valve.

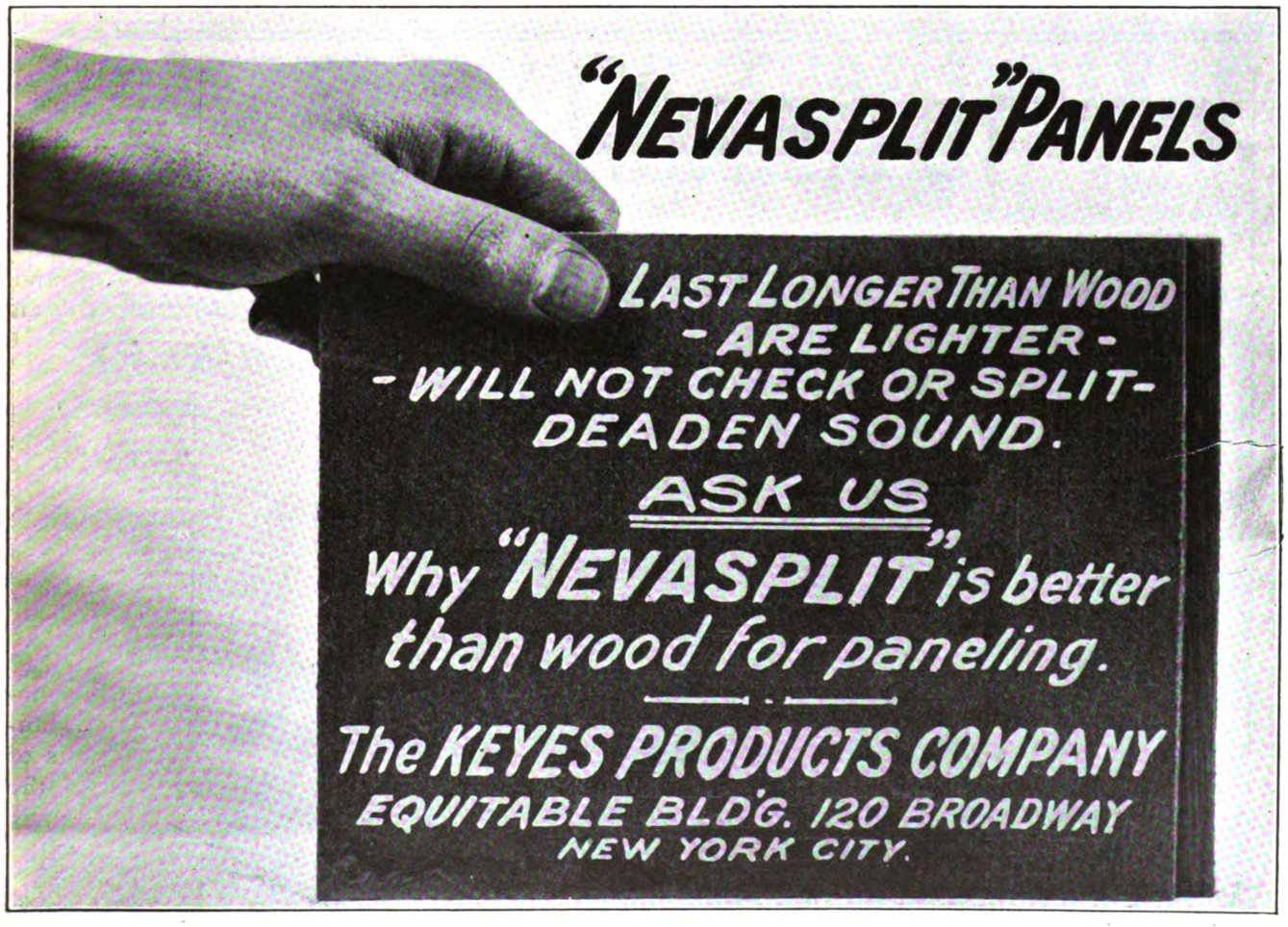
There is an interesting exhibit of the Lagonda Stirling Boiler Cleaning Device by which the entire operation of cleaning is from without the drum. The device is supported in an oval frame, representing the manhole, and has the cleaner and rubber operating hose inserted, just as in an operation. The electric and air or steam motor-driven reseating machines, for reseating and grinding fitting surfaces and cleaning scale and soot from caps and nuts of B. & W. and similar type boilers are also displayed.

There is a stand containing a full display of all types of water, air and steam turbine-driven cleaners for water and fire tube boilers, condensers and other tubular apparatus, also cleaners for curved tube boilers.

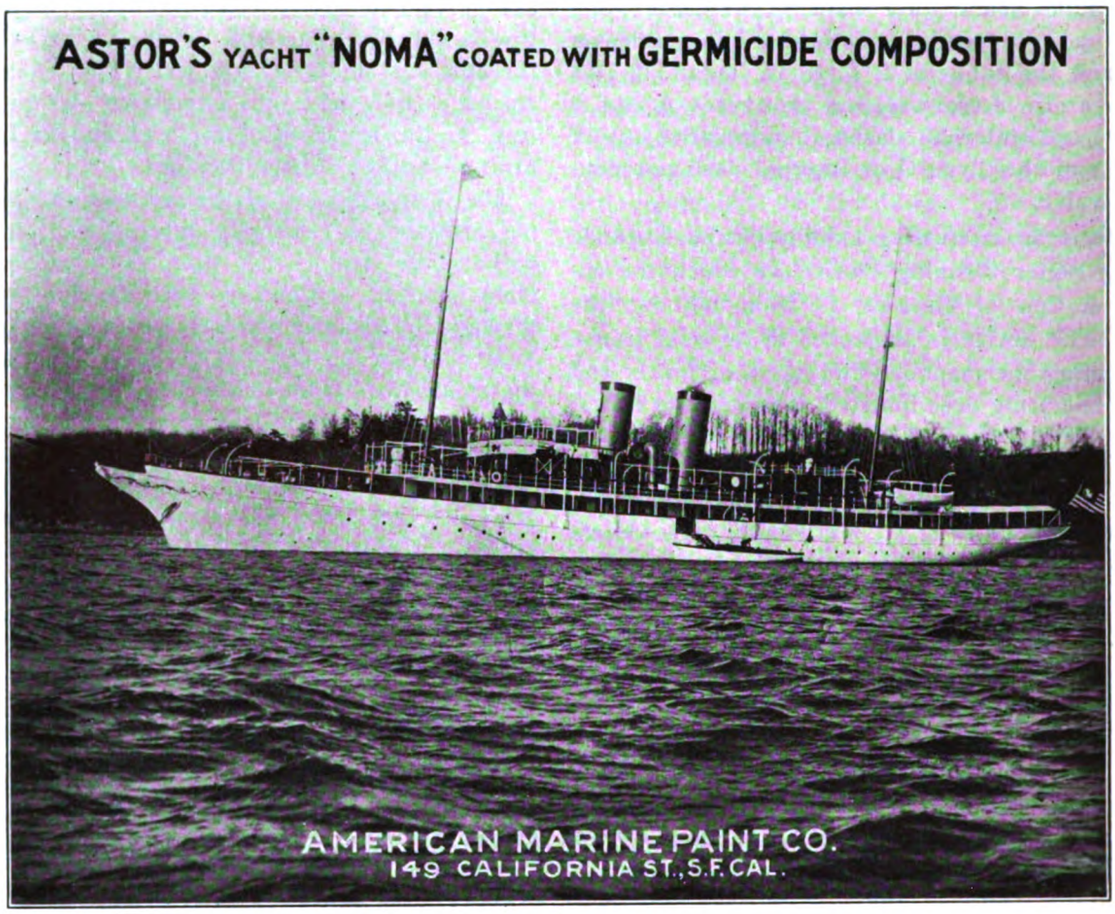
On a second stand directly behind the turbine cleaners are exhibited Lagonda Tube Cutters and a sectional model of the Type A automatic cut-off valve, showing the construction and operation of the valve and external dashpot. Directly behind this is the new Lagonda Grease Extractor and a three-basket multiple strainer. The Grease Extractor is of a new and interesting design, operating on the principle of the well-known Lagonda Multiple-basket Water Strainer.

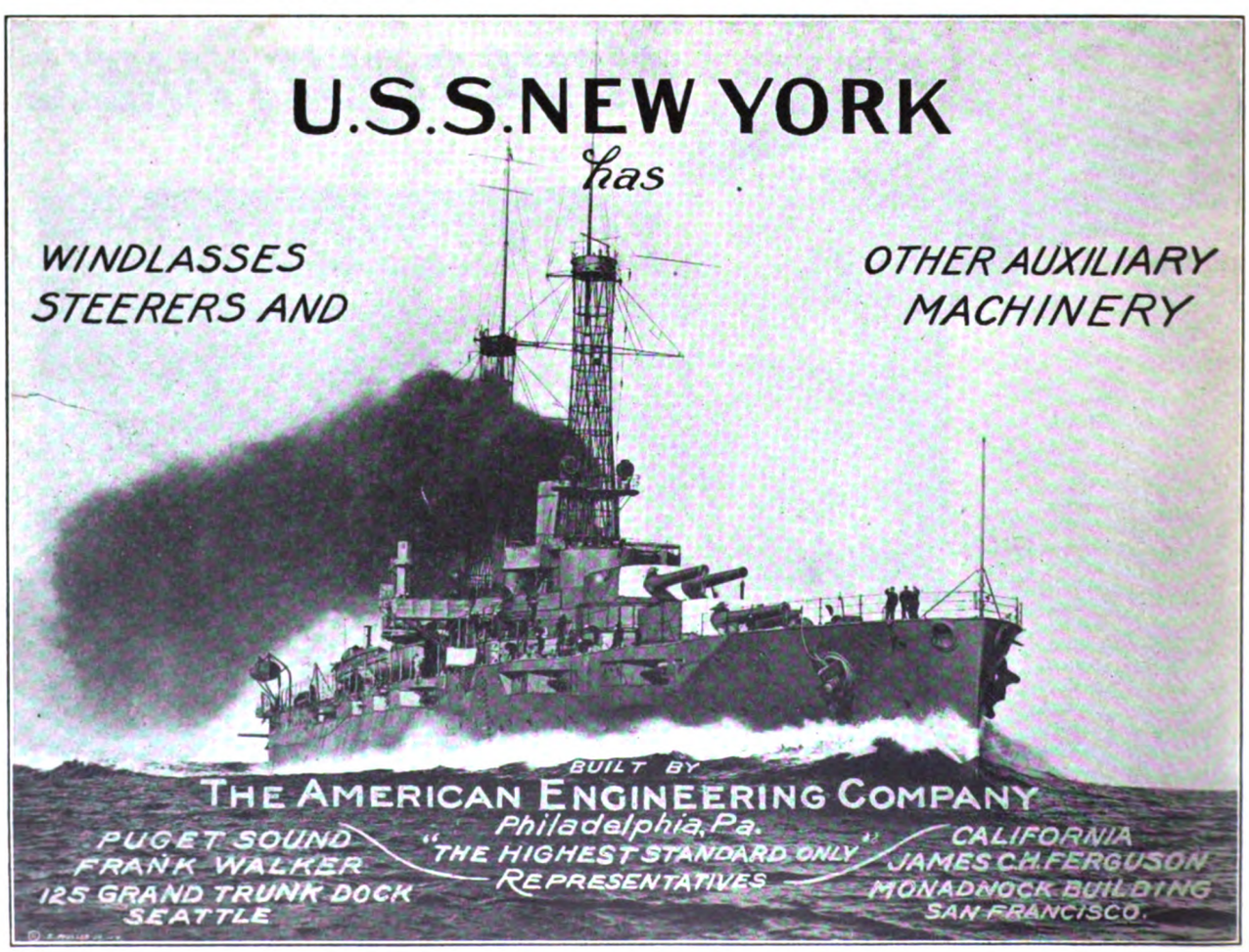
The demonstration of the working of the multiple strainer is especially interesting. A three-basket type strainer has been constructed with a glass panel at one end, so that the flow of water through the strainer and the accumulation of solid matter in the basket can be seen. In operation the small two-basket strainer body is used for inserting sticks, leaves and other such refuse as is found in plant supply water, then the water is turned on and allowed to flow through the strainer. All the solid matter passing into the strainer is caught in the strainer baskets. It is then demonstrated how the strainer baskets can be individually drawn out of commission, removed and cleaned without interrupting the operation of the other baskets or the flow of water.

The back wall and booth of the exhibit are finished in beautifully grained oak. All visitors are welcomed by members of the Lagonda Co., and the Chas. C. Moore & Co., Engineers, who have charge of the exhibit, and are the Western representatives of the Lagonda Company.



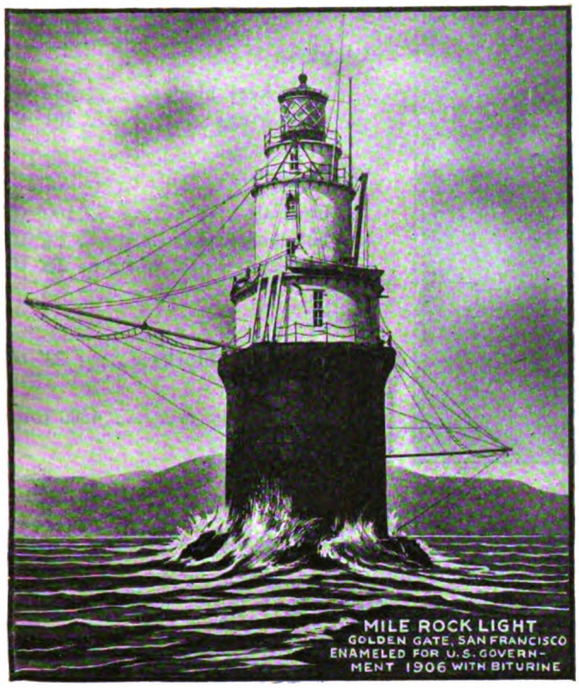
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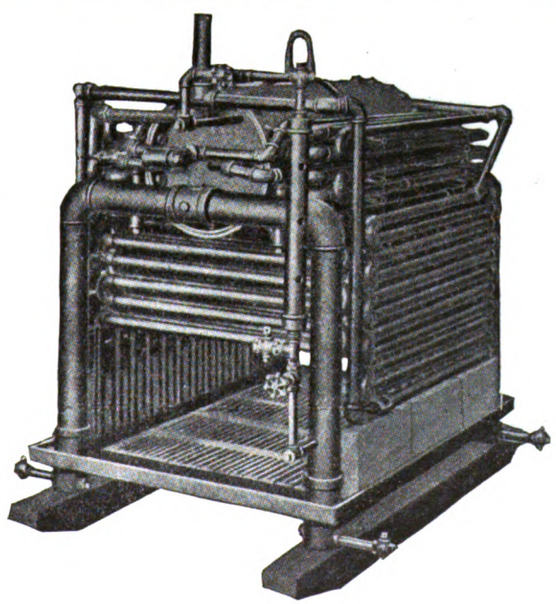
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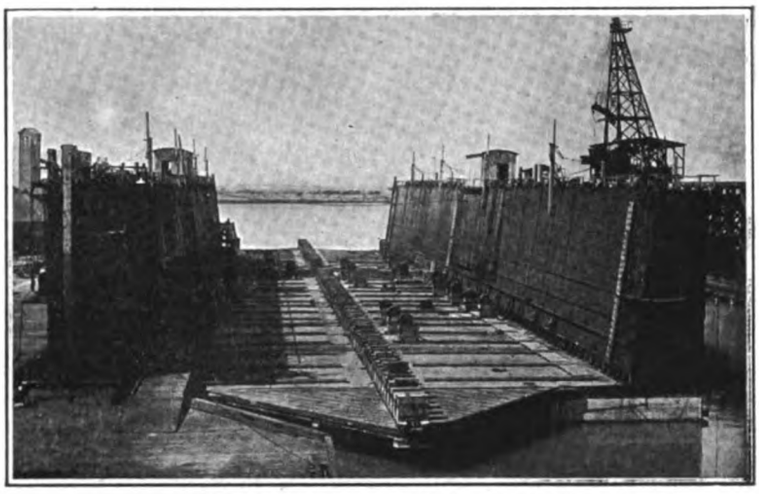
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Draft—

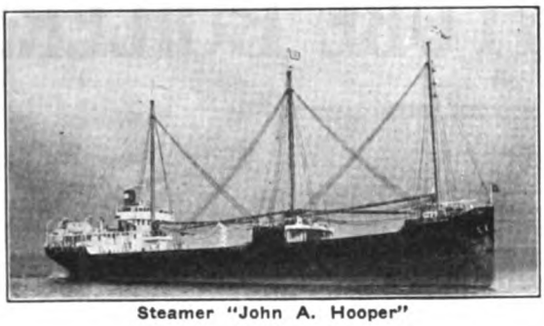
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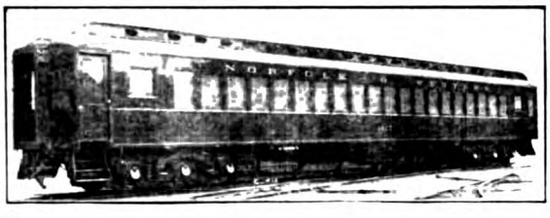
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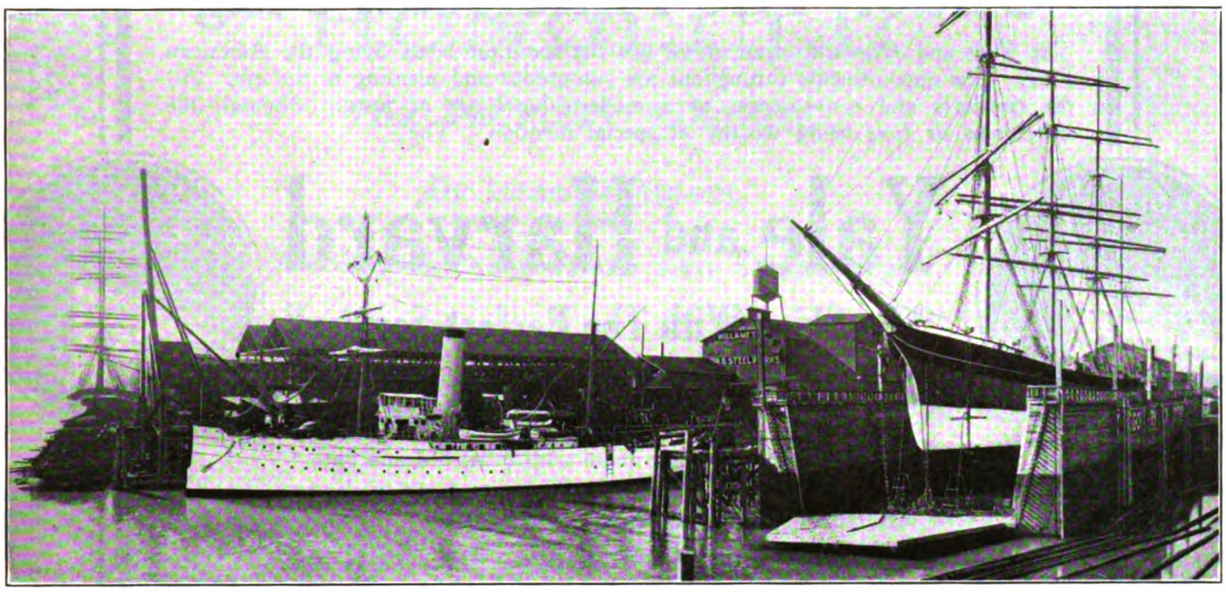
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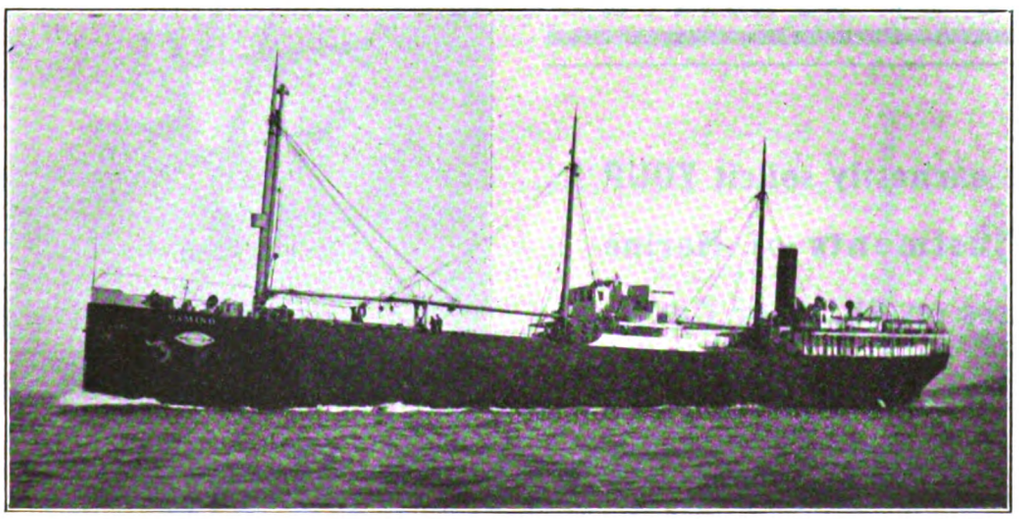
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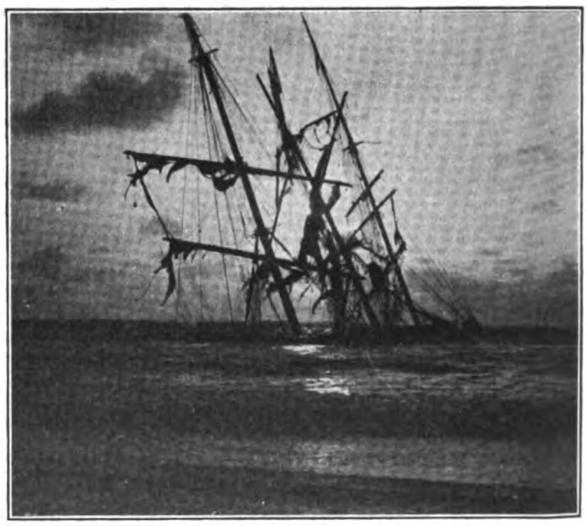
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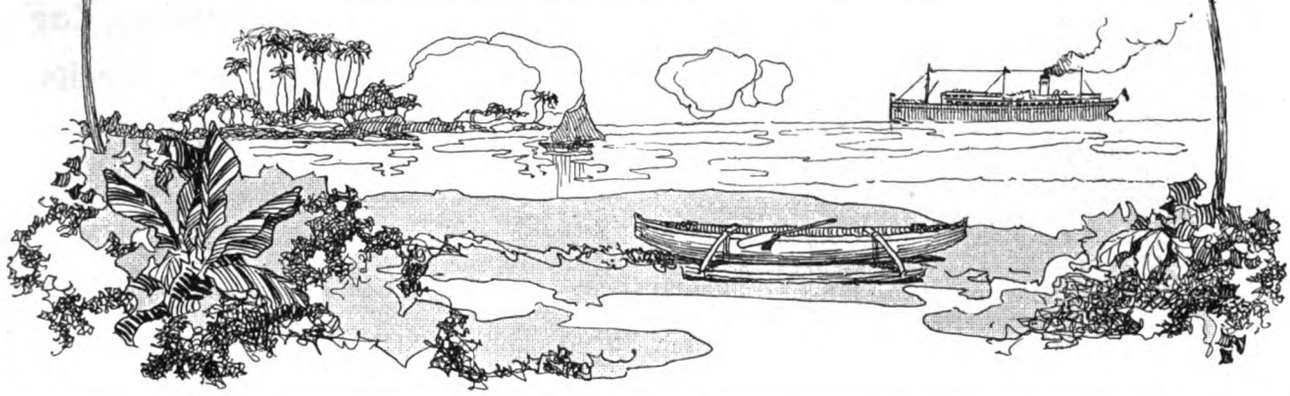
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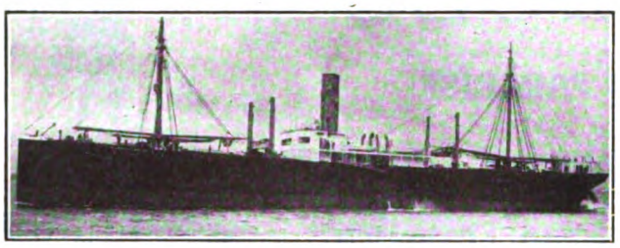
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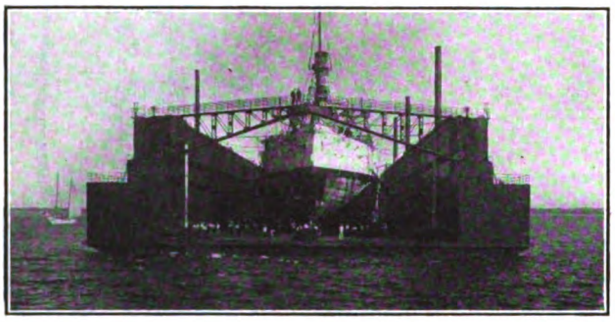
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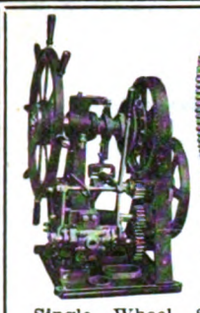
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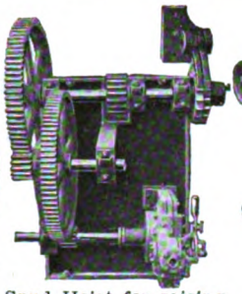
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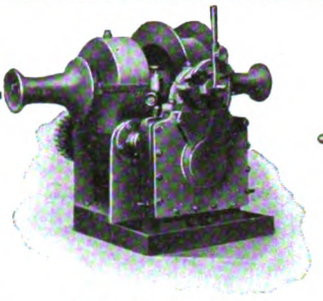
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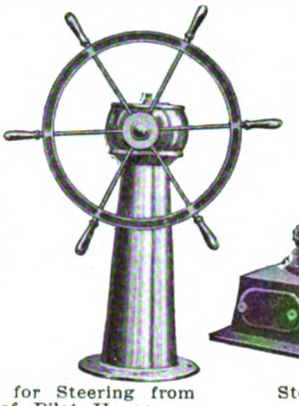
Single Wheel Steam Steering Gear



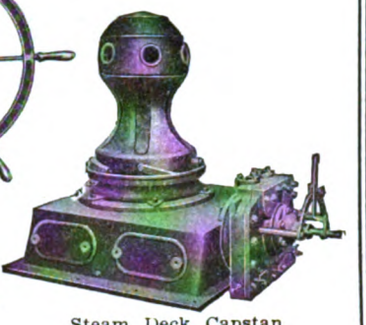
Spud Hoist for raising and lowering spuds on dredges



Gang Plank Hoist



Standard for Steering from top of Pilot House

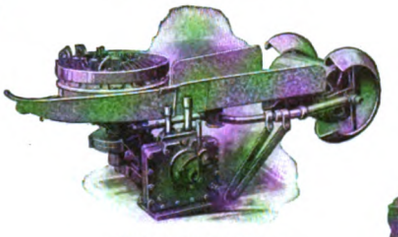


Steam Deck Capstan

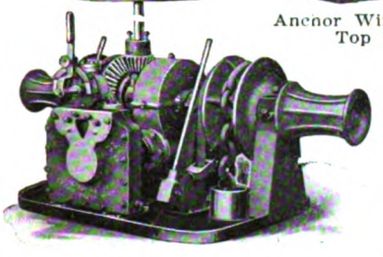




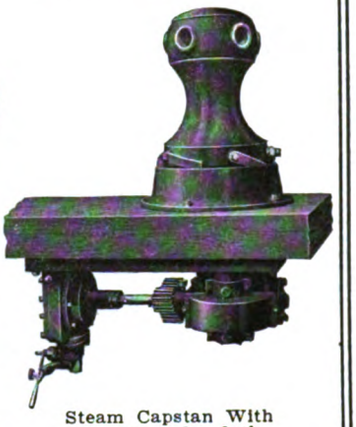
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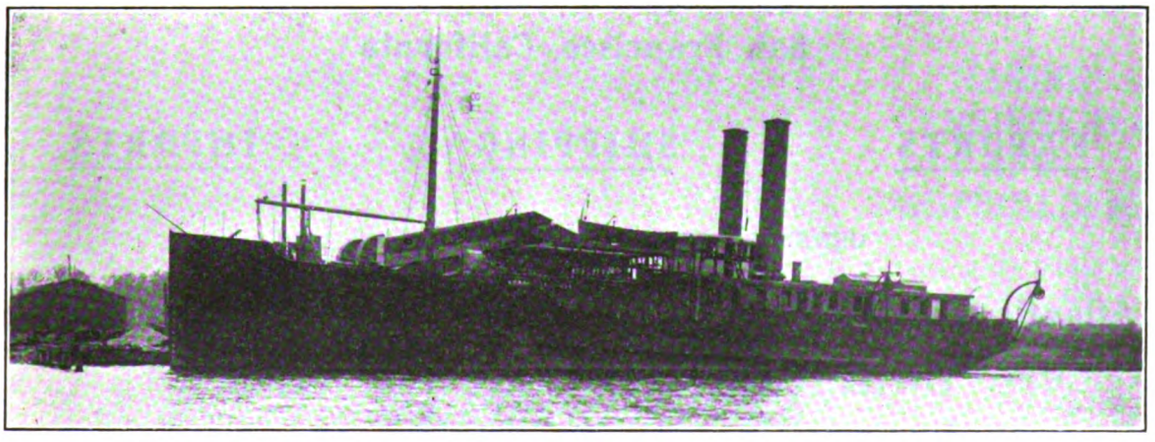
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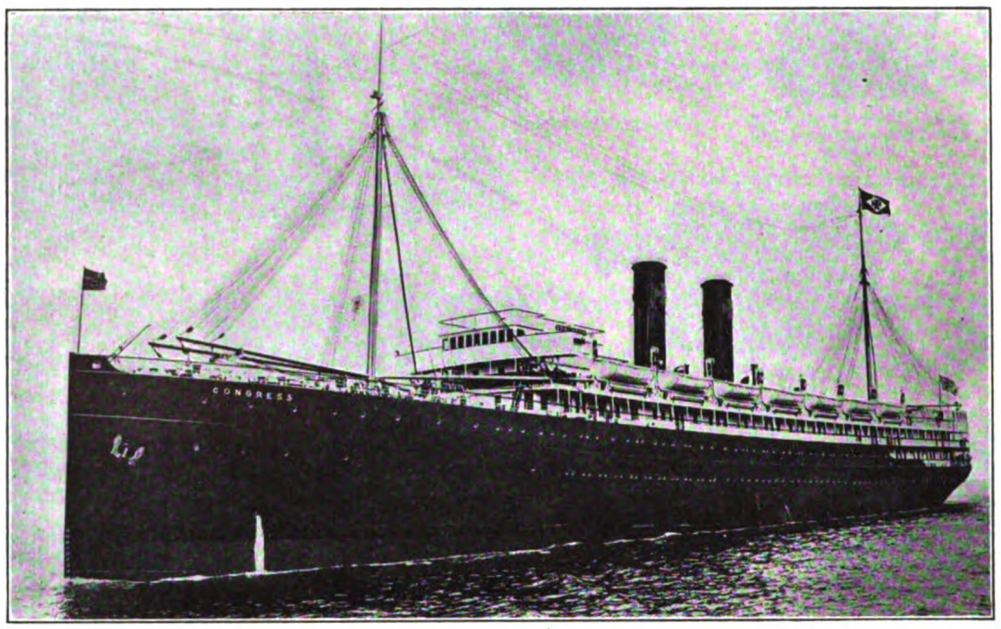
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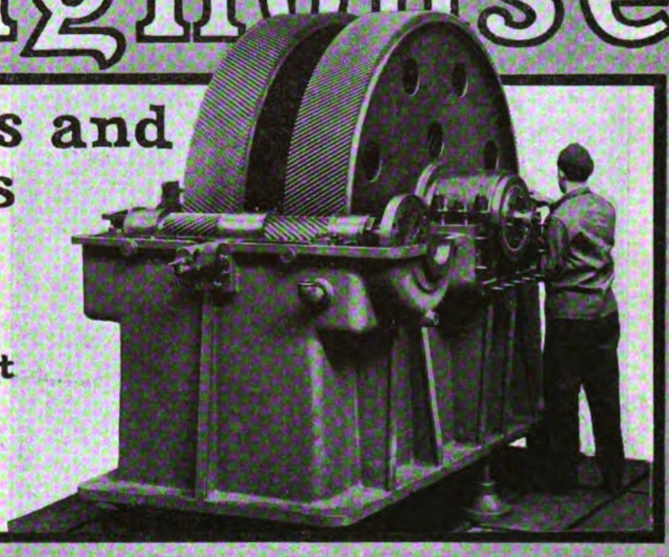
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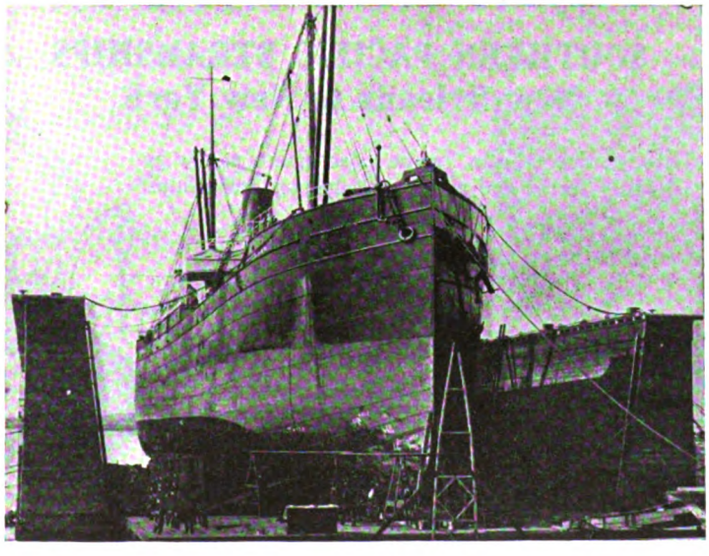


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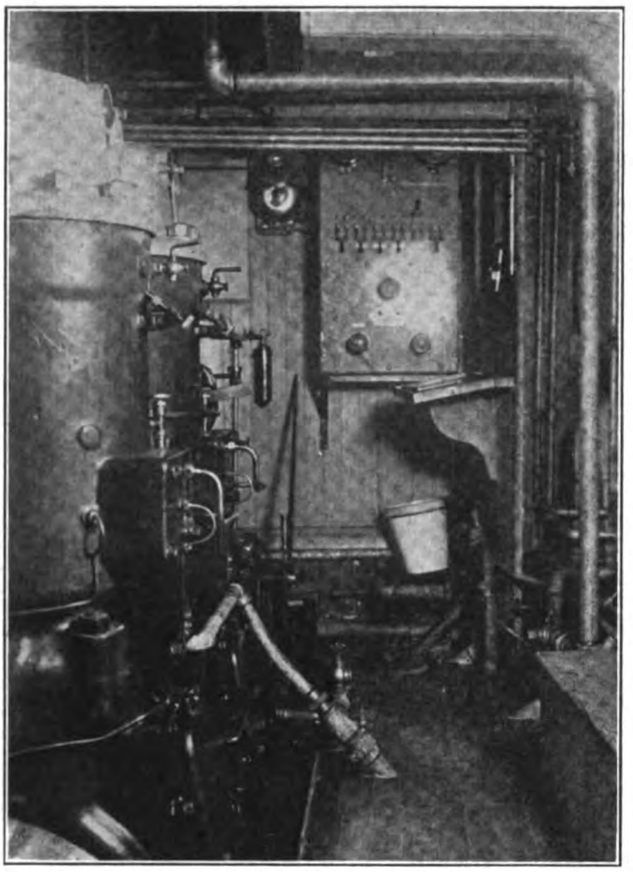
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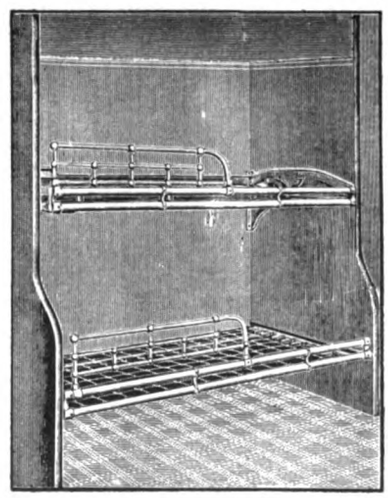
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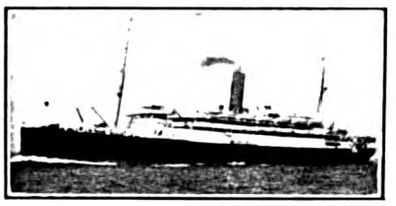
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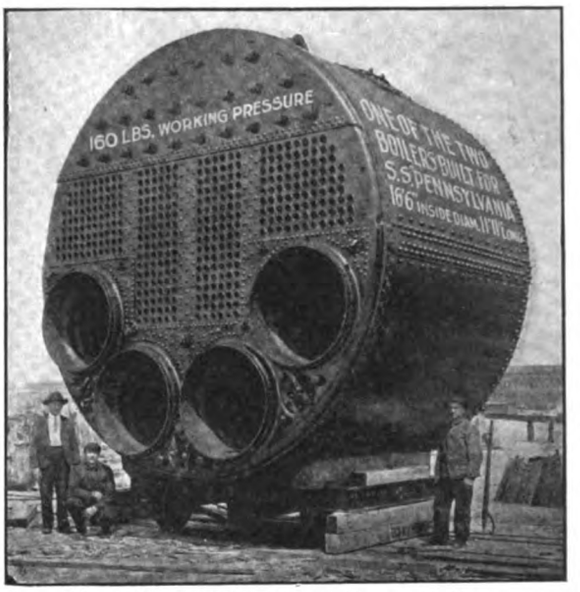
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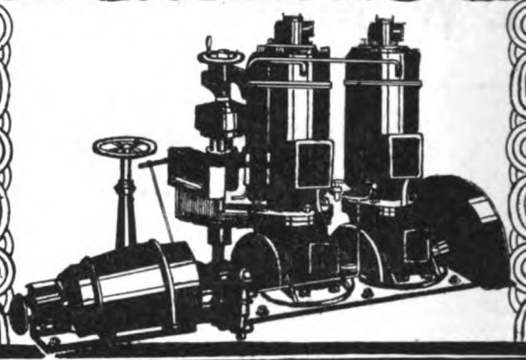
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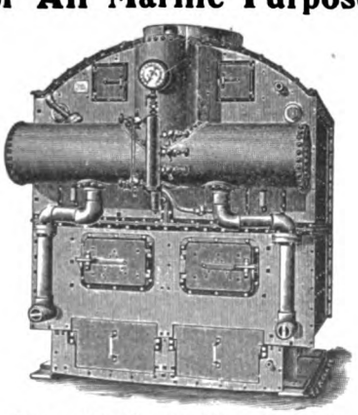
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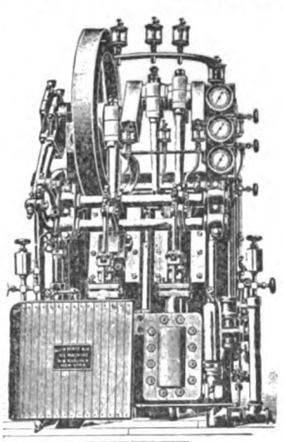
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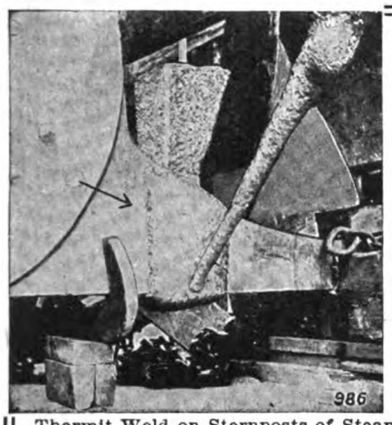
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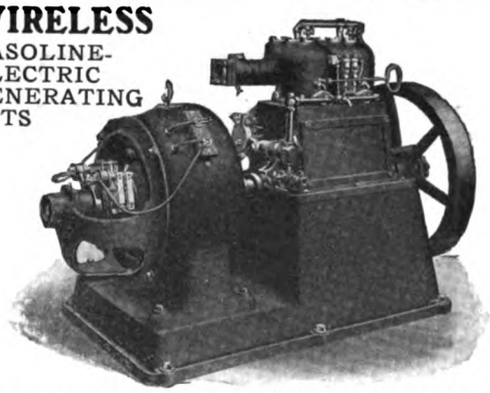
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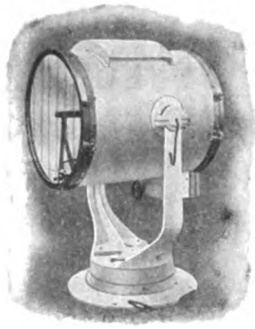
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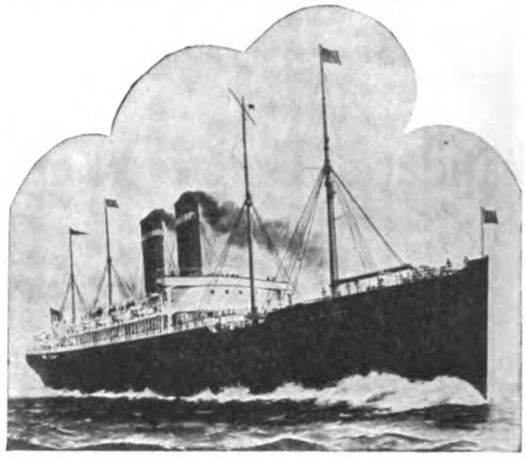


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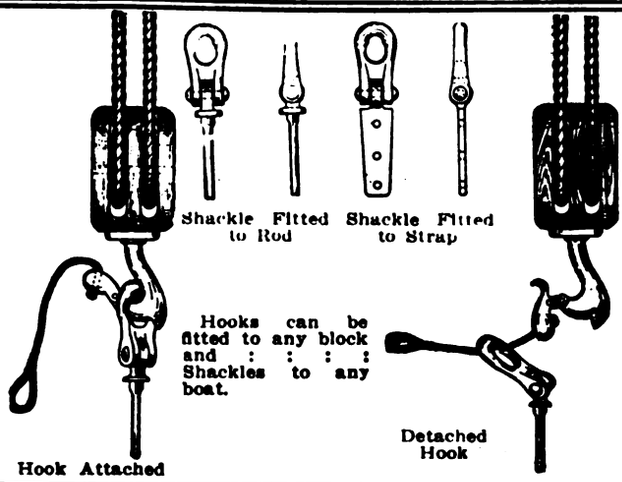
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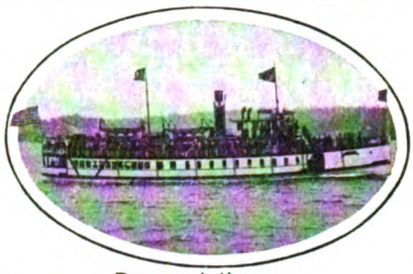


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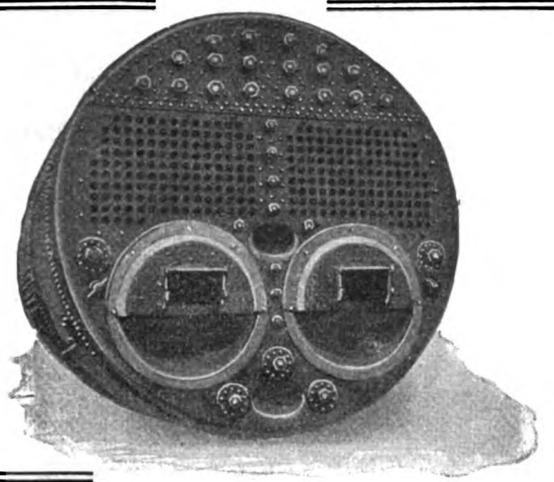
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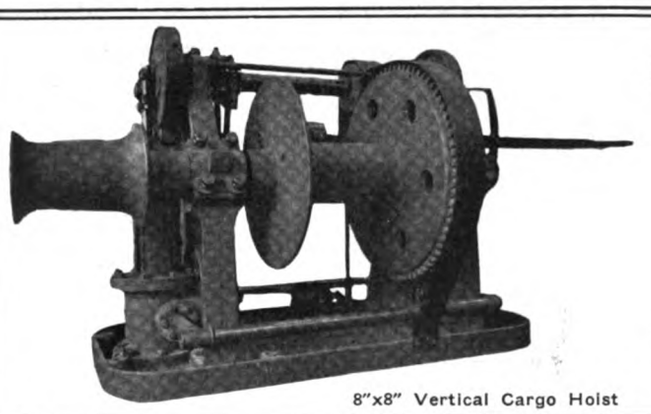


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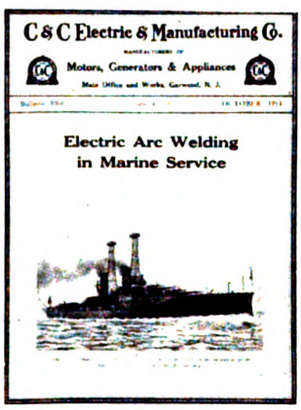
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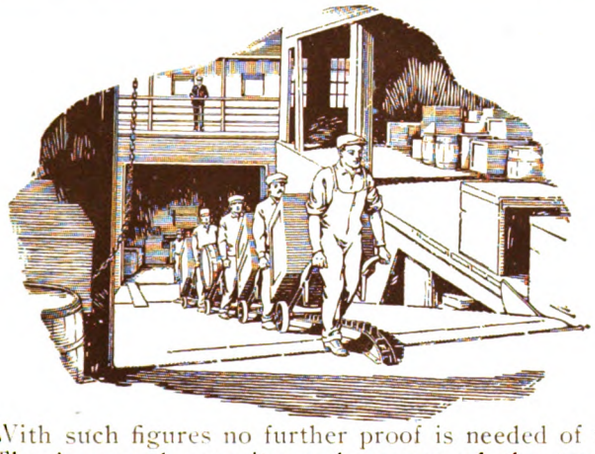
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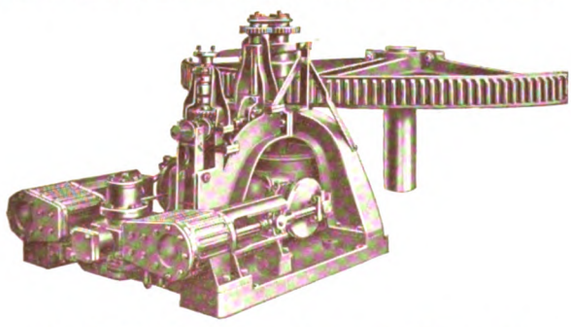
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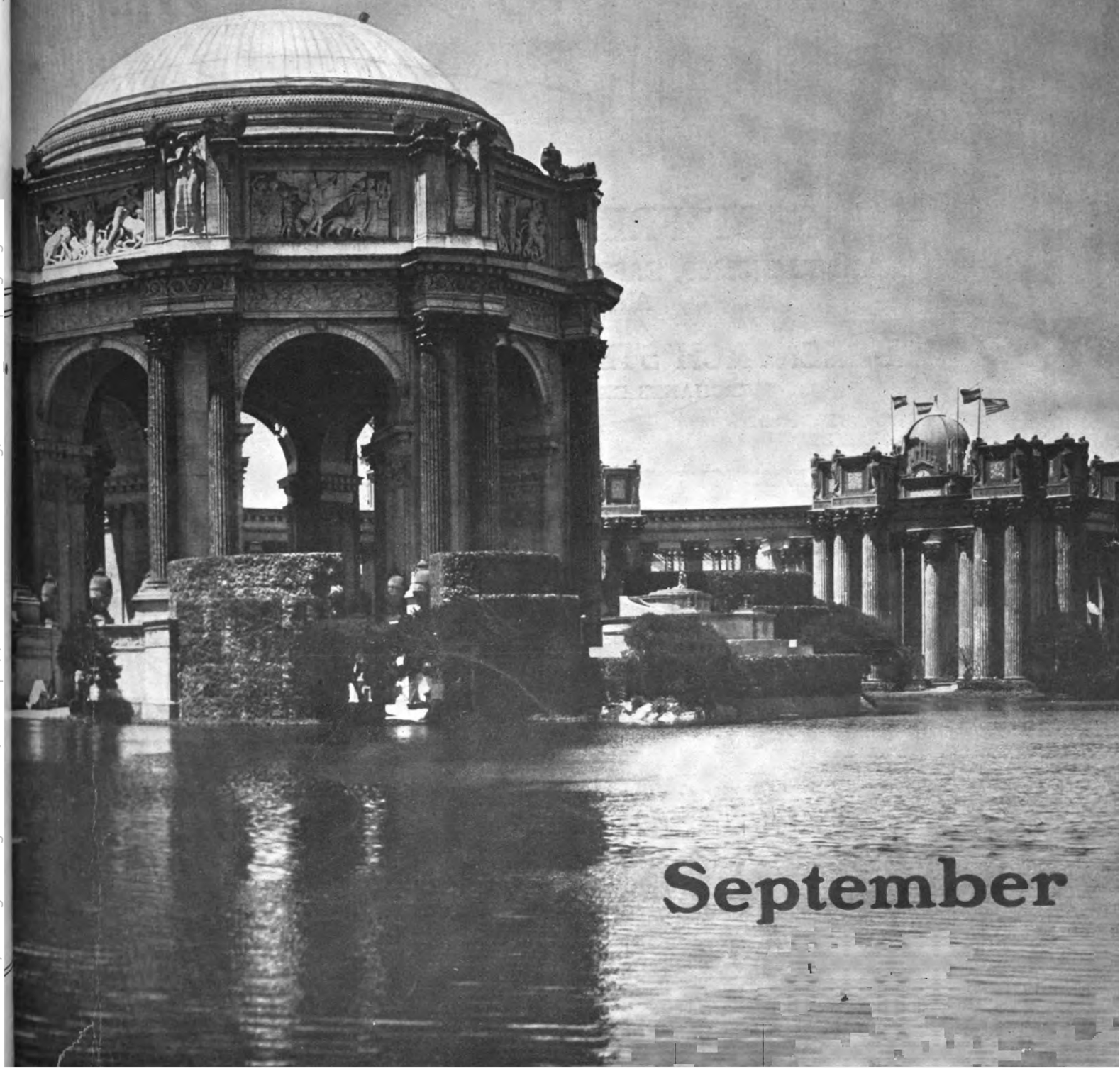
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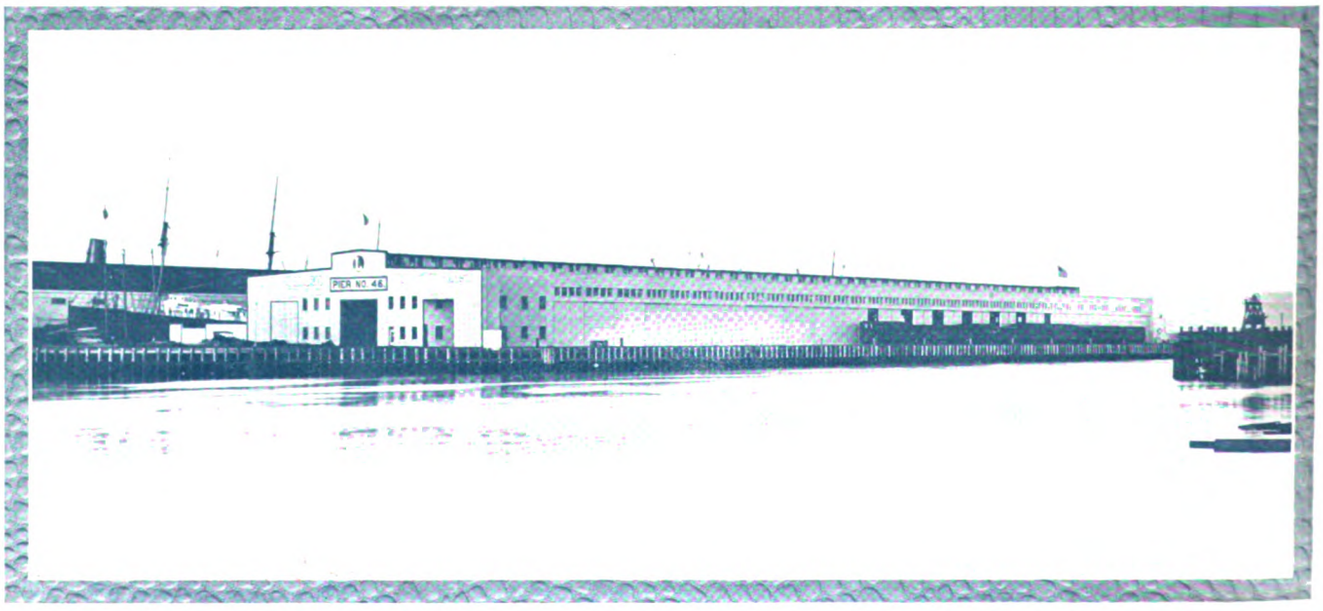
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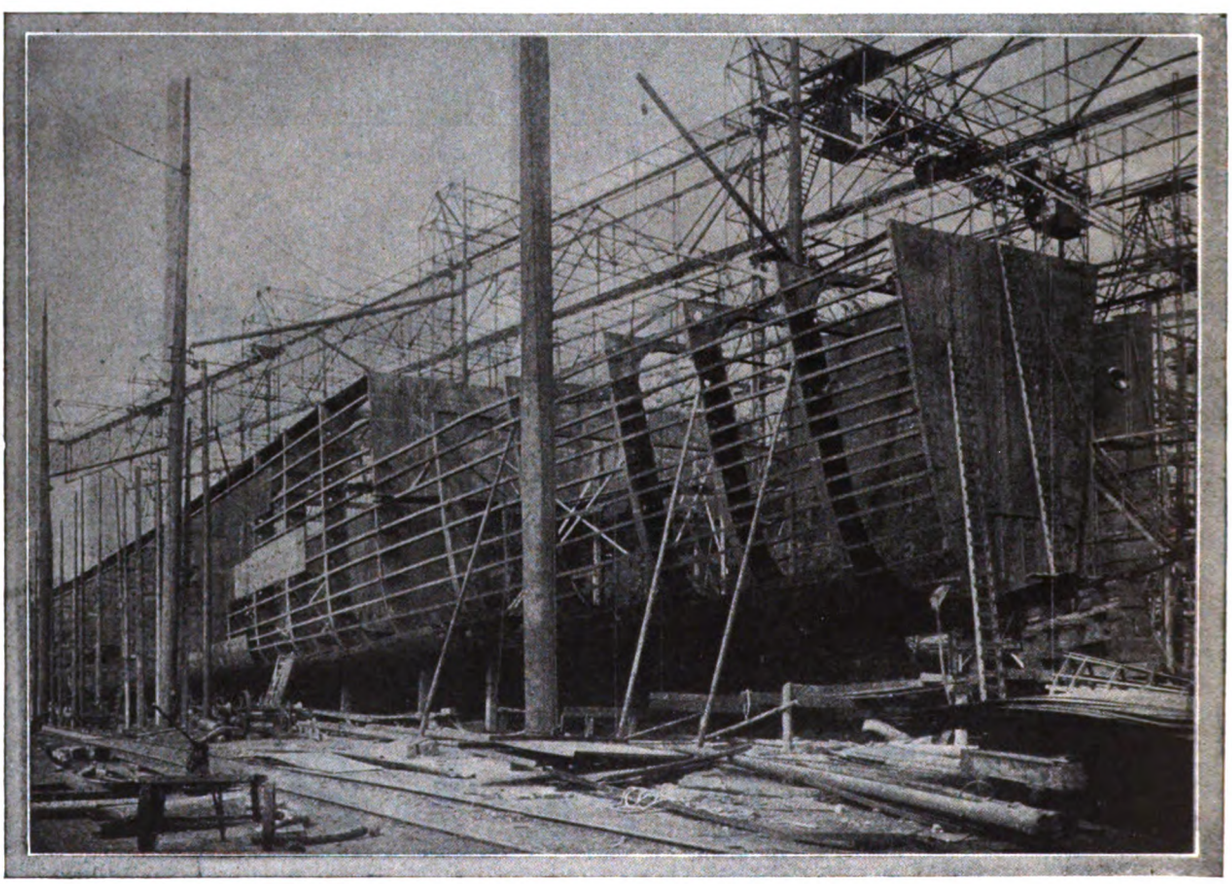
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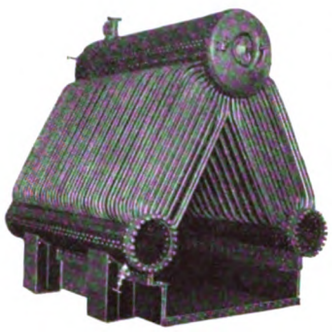
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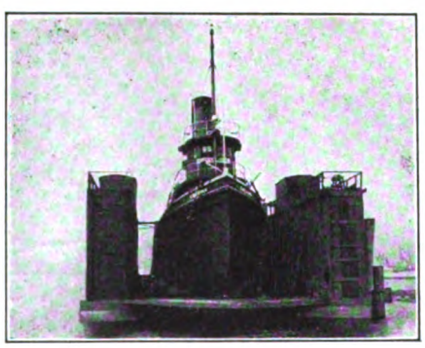
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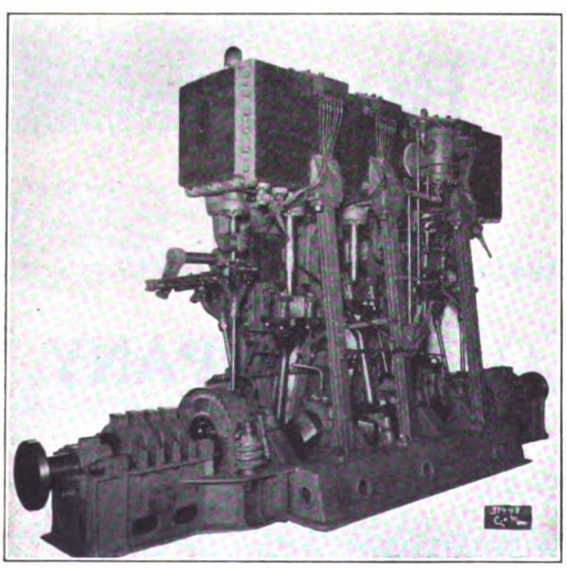
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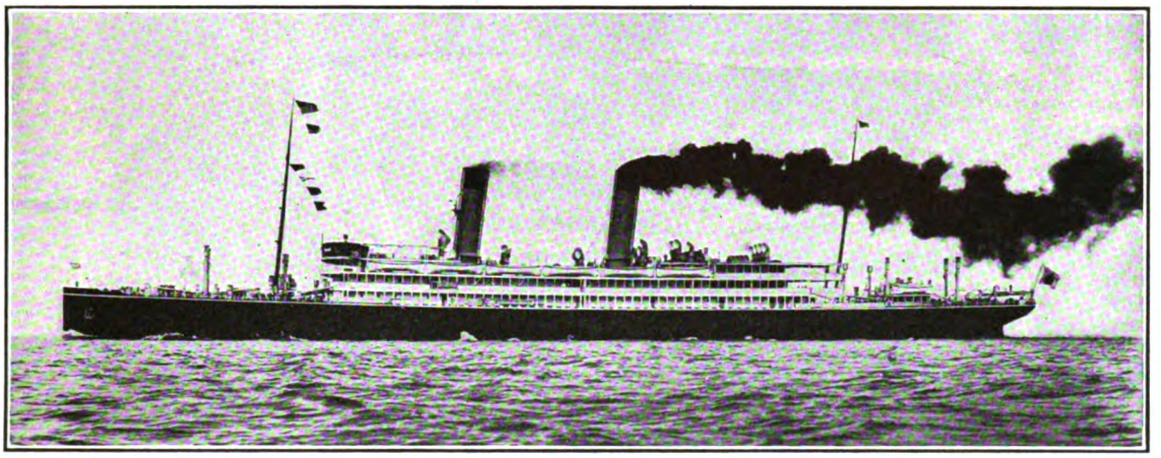
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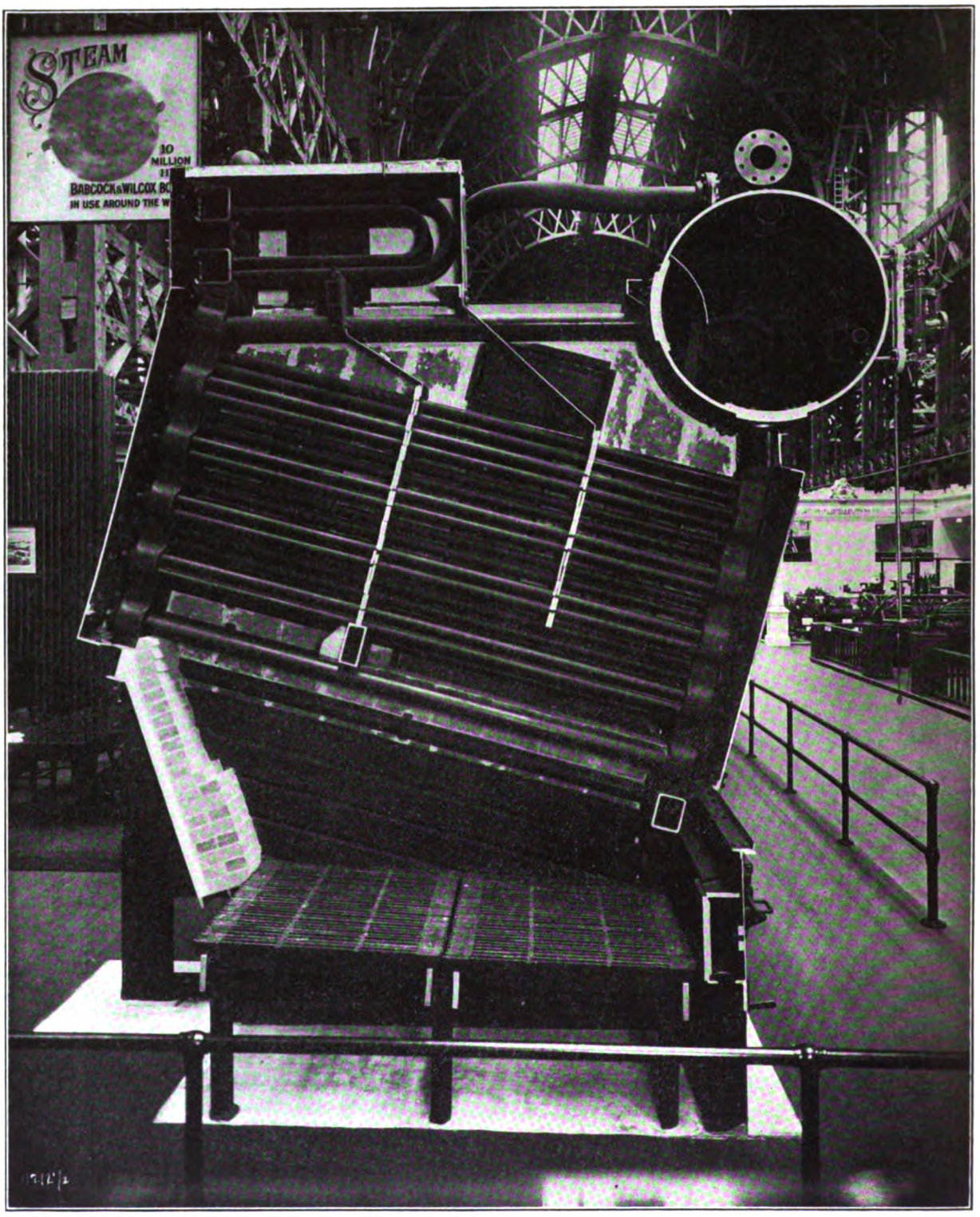
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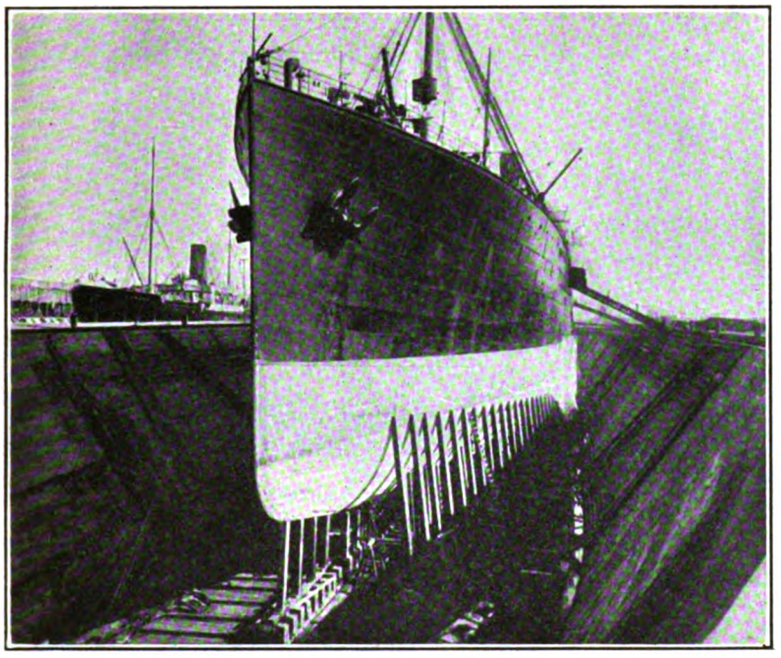
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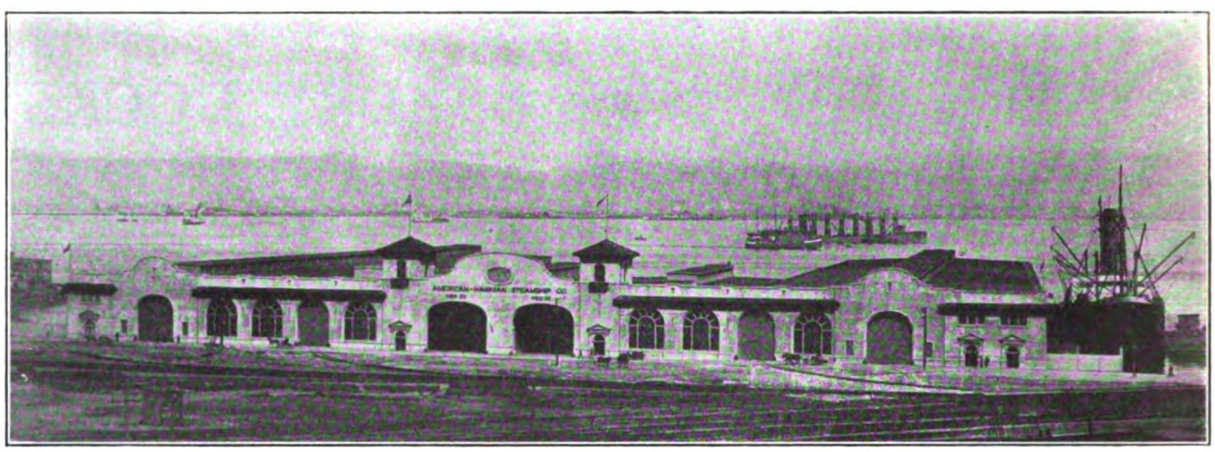
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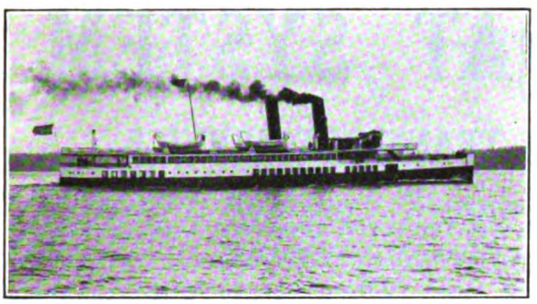
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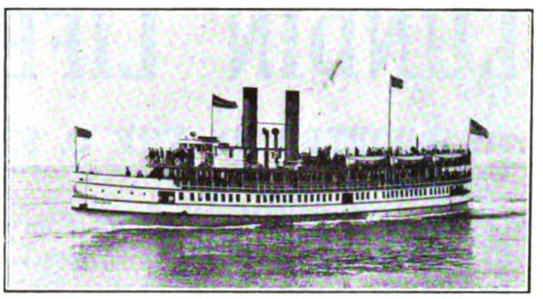
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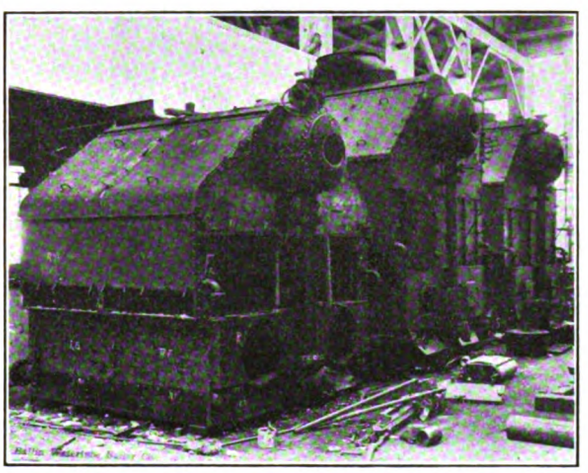
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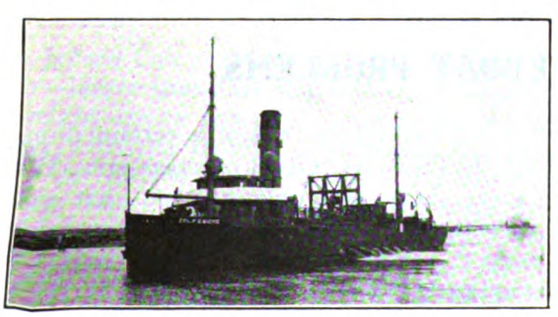


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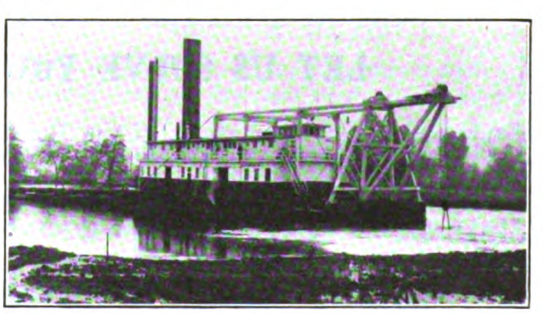
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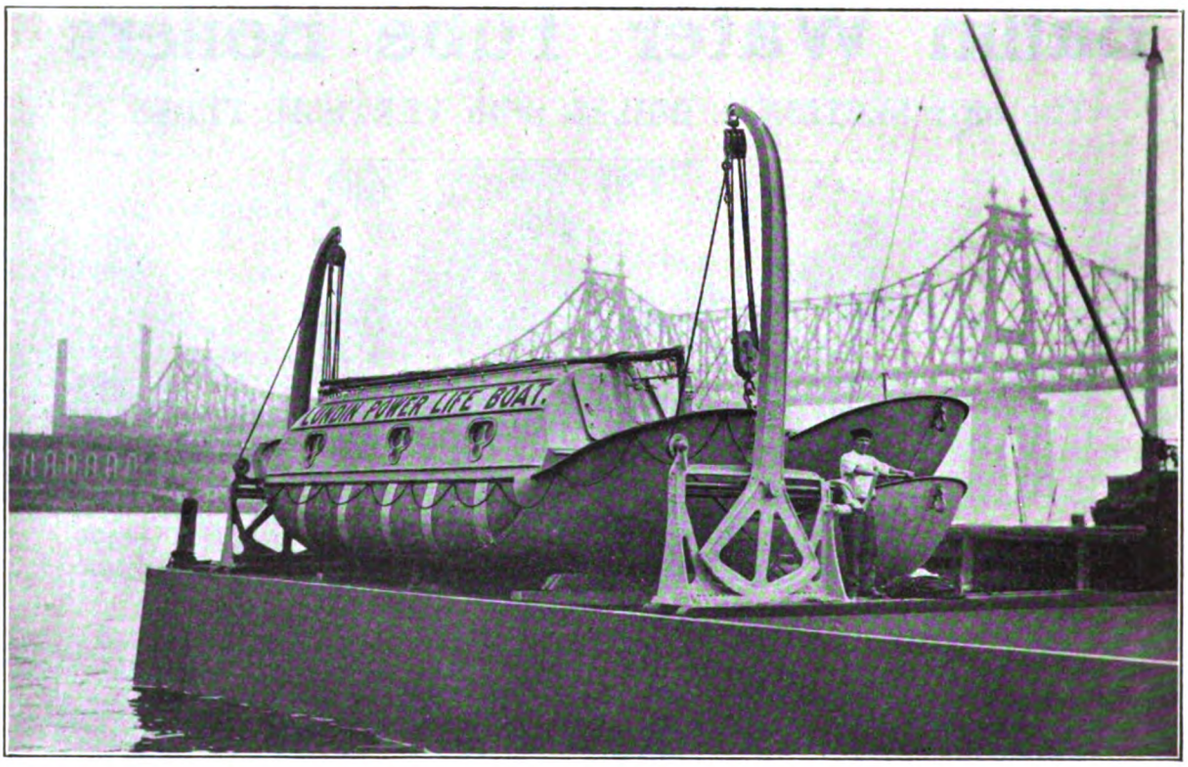
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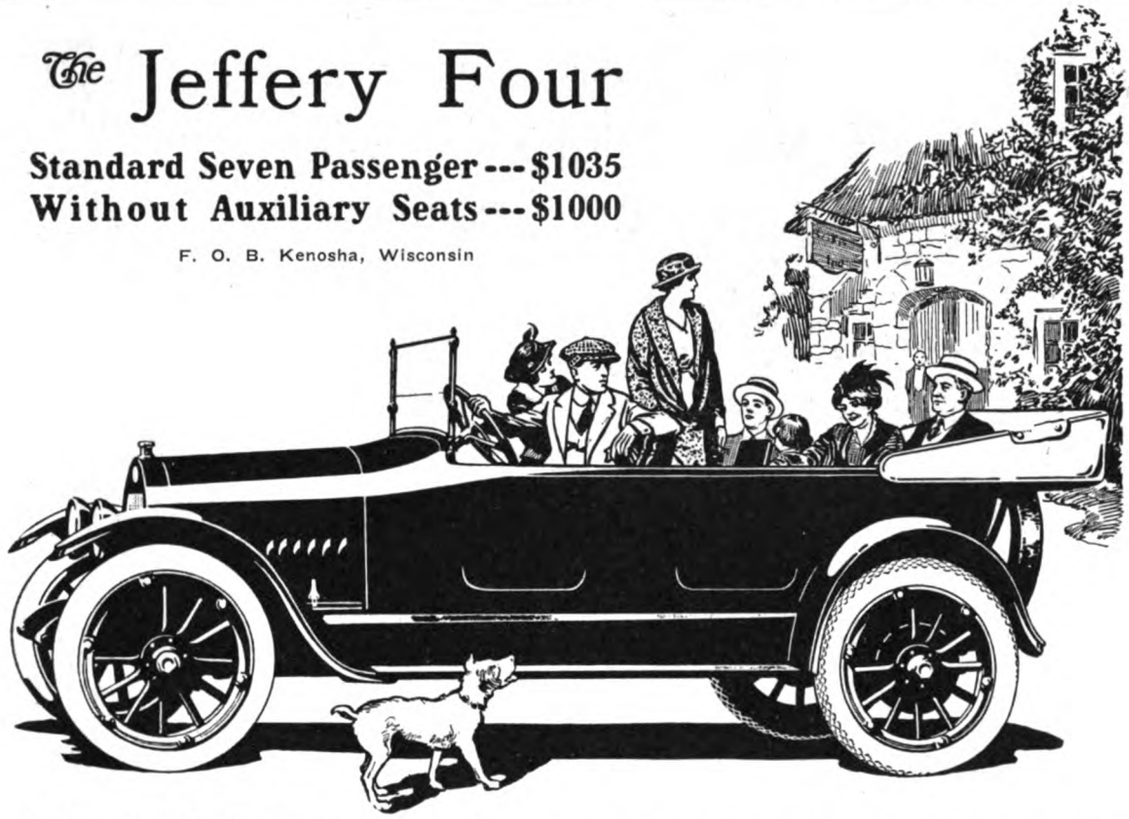
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In announcing this car, it is not the purpose of the Jeffery Company to meet temporary price conditions, nor to compromise with an imagined desire on the part of dealers and the public for cheapness. It is the aim and determination of the Jeffery Company to establish the Jeffery Four as a **standard** car at a **standard** price—a car which discriminating buyers can drive for a number of seasons without suffering the marked depreciation which has been such an unfortunate feature of the automobile business. The new Jeffery Four is a quality automobile in every sense of the word—built to maintain and increase the enviable reputation of the original Jeffery Four.

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LARGEST SHIPPING PAPER PUBLISHED IN THE UNITED STATES.

VOL. XII, No. 9. SAN FRANCISCO SEPTEMBER, 1915

The Seamen's Act

By E. F. DE GRANDPRE.

NO more dangerous, disparaging or treacherous law could have possibly been connived, by our friends Furuseth and La Follette, than this Seamen's Act. It places in the hands of the "laborers of the seas" greater power than can be wielded by steamship owners, operators and experienced officers combined or, in other words, is a means by which the "tail can wag the dog" and in the premises the tail is a "bobbed" one at that and there is practically no limitation to the wagging that can be done.

As a result of the impossible provisions of the language clause, which affects the transpacific lines, our law makers, who had no foresight and would not listen to the steamship owners in their pleas against the enactment of such ridiculous law, are now surely able with their hindsight to see their mistake, as already the Dollar Steamship Company have sold two of their vessels for operation under foreign flags and are endeavoring to dispose of their remaining transpacific steamer. This action was not taken by Captain Dollar until he had exhaustively endeavored to formulate a plan to continue the operation of his vessels under foreign flag himself, and to retain the splendid business that he had built up for himself through years of hard work.

The Pacific Mail found it would be an utter impossibility to continue, and there is no question but what the other American transpacific steamer, the "Minnesota," will be sold or operated under a foreign flag.

Representative Alexander is reported by the press as stating that the steamship owners are going out of their way in endeavors to discredit the action of Congress by taking these steps instead of educating their crews so that they may understand the English language. In suggesting the possibility of this he, of course, has not considered the facts in the premises, that is, he is putting forth another theoretical idea.

With the incessant changes in the make up of crews, the operators would have an endless and impossible task on their hands to undertake to fit sufficient Chinese coolies for the work, in accordance with the provisions of the Seamen's Act, to insure of their always having an ample supply of such Chinamen available.

The Wall Street Journal aptly remarks with reference to this legislation: "Labor unions win a victory through the La Follette Seamen's bill, so did the farmer who, to prevent boys from picking up apples in the orchard on which his living depended, cut down the trees," in other words, Congress has not been able to protect this labor union against its own viciousness to prevent it from retrogressing and pulling a substantial industry of the country down with it.

From the sentiment that is at present broadcast, there appears to be little question that the above provision of the Seamen's law will be repealed in the next Congress and some opportunity revived for a partial rehabilitation of the transpacific service by American shipowners. Not the present ones probably, as their interests are at present being sacrificed. They have lost faith in the Government, in this respect, and will not wait to see if this change does come to pass.

The next question is, will it require further hindsight to obtain repeal of the law as a whole, that is, will Congress require that the coastwise shipping activities suffer and become stagnated before

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relief is given them? If the law as a whole or the most of its provisions are not repealed, this will surely be the eventual outcome, primarily for the reason that the seamen have in their power, under the law, various weapons that will compel compliance with any demands they might care to make for increased wages and there is no limit to the disastrous results that would follow. For instance; while they constitute a small and unimportant portion of the crew of an ocean-going steamer, increases granted them would necessarily mean increases in other departments which would, in the aggregate, be burdensome and eventually result in steamers tying up at the docks to remain idle.

It must not be forgotten that practically all coastwise vessels are in competition with railroads, and lower rates must be maintained on steamers than on trains. With the present operating cost of steamers it is just possible to maintain sufficient margin below the rail rates to attract a suitable proportion of travel and freight to the steamers.

For various reasons a large proportion of the passenger and freight traffic is not available to steamers at any rates, such as, for instance, all the passenger traffic between points inland from the coast, not reached by vessels, passengers who must, for business or other reasons, travel as rapidly as possible, likewise time freight, light and bulky freight, etc. Hence it is becoming more difficult for coastwise lines to operate without undue burdens and make any returns on the investments, and rates can not be raised materially to take care of increased operating costs, and a few thousand dollars per month increase in wages in the case of most operating companies would put them out of business. This result will surely come to pass if the Seamen's law remains with us.

One of the provisions of the Act provides that an able-bodied seaman shall be such a person as has served from one to three years at sea, also that a certain percentage of the crew shall be of this rating. In event of controversy with the Seamen's Union, as a result of any demands on their part, the operating company would have to tie its vessels up, as there are no seamen available except through the union, and although there is no particular necessity for an ordinary seaman to have had a year or more experience at sea or, in fact, a month or more, nevertheless persons could not be employed to fill the positions made vacant by striking seamen because they had no such experience.

The duties of an ordinary seaman in coastwise service nowadays consist of scrubbing the decks, washing paint, painting at odd times, casting and weighing the anchors under directions of the mate, which directions are explicit and can be executed by any ten-year-old boy after receiving a few instructions. These men have nothing to do whatever with the navigation of the ship at sea and add nothing to the safety of the passengers.

Their champions would have you believe that they are necessary expert life-boat men, that passengers' lives would be in jeopardy at sea were it not for the presence of these seamen. It does not follow that because a man works on a steamer he is familiar with the handling of a life-boat in a sea. He may have had several years' experience on vessels and never been called upon to man a life-boat in the water. There are ample able life-boat men always in the balance of the crew, consisting of the commander and his officers, boatswains, quartermasters, engineers, water-tenders, oilers, firemen, stewards, waiters, etc.

The seamen on a large coastwise vessel aggregate 10 or 12 out of a total crew of 150 or more. To illustrate this clearly I incorporate below the crew list of the SS. "Congress":

Deck Department.		Assistants	4
Captain	1	Butcher	1
Officers	4	Second butcher	1
Boatswain	1	Kitchen Scullerymen	3
Carpenter	1	Baker	1
Quartermasters	4	Second baker	1
Seamen	12	Third baker	1
Deckboys	4	Pantryman, first cabin	1
Watchman	1	Second pantryman	1
Engine Department.		Third pantryman	1
Chief Engineer	1	Pantry scullerymen	3
Assistants	3	Messman	1
Junior engineers	3	Second messman	1
Deck engineers	4	Messboys	2
Watertenders	3	Watchmen, first cabin	2
Oilers	6	Waiters, first cabin	31
Firemen	9	Bellboys, first cabin	7
Storekeeper	1	Waiters, second cabin	7
Clerical.		Waiters, third cabin	7
Purser	1	Second cabin steward	1
Clerks	3	Second cabin pantryman	1
Steward's Department.		Second cabin scullery-man	1
Chief Steward	1	Second cabin stewardess	1
Kitchen stewards	3	Second cabin barkeeper	1
Stewardesses	2	Second cabin watchman	1
Matron	1	Third-class steward	1
Storekeeper	1	Chair boy	1
Barkeeper	1		
Linen keeper	1	Total	157
Chief cook	1		

It will be noted that in the above crew the commander has with him four officers to relieve him on the bridge, a boatswain, four quartermasters for the handling of the steering gear, twelve seamen to do such labor as may be necessary, four deck boys to assist them and a watchman. He has, in the Engine Department, a crew of 30 men, three more than necessary, these being the water tenders, who are required in United States service but not in foreign service, a clerical department of four and a steward's department of 95.

The seamen in coastwise service receive a wage of $50.00 per month for nine hours' work per day,

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which is a union day, also their sustenance and 50 cents per hour for overtime. This overtime consists principally of operating the winches and other work in connection with cargo handling while in port. It has been proven from the records of several of the steamship companies operating on the coast that the average wages earned by the coastwise seamen, including overtime, is around $90.00 per month. How does this compare with the wages of laborers ashore, who have to pay their board and lodging out of the wages they receive?

Under one of the provisions of the Seamen's Act the seamen are to be divided into at least two watches. If this means that two twelve-hour watches of equal number of seamen must be maintained it will mean that every seaman will receive three hours overtime per day on account of the union day being of nine hours, $1.50 per day for twelve seamen or a total of $18.00 per day or $540.00 per month. At least three-fourths of the time the steamer would be at sea where the extra three hours time of each man could not be employed to compensate the company for the money paid. This would amount to $400.00 per month extra expenses or say, on a fleet of ten steamers $4000.00. This extra expense could not be stood by the steamship company.

The present system is to utilize the services of most of the seamen during nine-hour day when their time can be employed to advantage in doing necessary work about the vessels, the balance of them being used during the night as lookouts.

While quartermasters are seamen who have been assigned to this special work and are members of the Seamen's Union, they are really petty officers who have had sufficient ambition or interest in their vocation to make this step forward and who, upon showing ability to pass Government examinations, will pass through the successive steps of 4th officers, 3rd officers and so on to commanders. This is the proper and entirely adequate means of betterment of the conditions of the seaman. There is no limit to the plane he can reach if capable of advancement and those who are not capable of other work than ordinary labor are already well taken care of in their present positions by the payment of $50.00 per month wages, 50 cents per hour overtime, comfortable sleeping quarters and food that any of us would relish.

There are numerous provisions in the law which will enable the seamen to cause trouble at any time they may see fit by declaring a steamer to be, in their opinion, not properly equipped, their food not good enough for them, etc., and so on, or by demanding higher wages.

In case of a strike of seamen in the Government Steamship service on the Atlantic Coast a few years ago the Government manned their vessels with man-of-warsmen. I wonder if they will furnish man-of-warsmen to the commercial lines when they have such trouble. In the Seamen's strike on this Coast, several years ago, the commercial lines worried along for a considerable period using office men and other landsmen whose services could be obtained, to take the places of the seamen, waiters and others, and operated successfully although the continued harassing tactics of the Union made operations necessarily very expensive and the lines involved eventually surrendered to the Union. When this law becomes effective, if it does, it will, in the future be a case of surrender without a fight because landsmen cannot be used to perform such services even though they can properly do so, when instructed in the duties, because they have not served one or more years at sea.

If this law does become effective it is as certain as the sun will continue to shine that the coastwise fleets will eventually dwindle away as the transpacific fleets are now doing. The steamship operators are now taxed to the limit of their financial and operating ability by the burdensome Government regulations in other respects.

The Panama Canal lines, and practically all vessels sailing between American ports and foreign ports, are, at present, enjoying an unusual temporary period of great prosperity on account of conditions in Europe, but this should not be confused to include coastwise steamers which are, on the other hand, practically all suffering from depressed business conditions the same as the average mercantile industry.

This law, the same as some of the other new laws, is founded upon suspicion of business enterprise based on ignorance of actual existing conditions.

OPPORTUNITY IS WELCOME.

The Mitsuibishi Dockyard at Nagasaki has seven steamship contracts under way, the Kobe yard of the same company is constructing three steamers, the Kawasaki Works of Kobe is building nine steamers, the Osaka Iron Works is building twenty-two steamers, the Uraga dockyard is building four steamers, the Harima Dockyard two, the Ona Shipyard one, the Harada Shipyard one and the Fujinagata Shipyard two steamers. The splendid condition of the Japanese shipyards as far as new orders are concerned would seem to indicate that the Seamen's Act has been productive of good results in one country at least.

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La Follette's
MAGAZINE

"YE SHALL KNOW THE TRUTH AND THE TRUTH SHALL MAKE YOU FREE"

VOL. VII, NO. 7. MADISON, WISCONSIN. JULY, 1915.

The Ship Owners' Conspiracy

THIS country is being made the victim of a vicious and menacing conspiracy. The Shipping Interest is putting forth every resource known to unscrupulous business to discredit the Seamen's Law. Through obliging commercial organizations, commercialized city dailies, subservient magazines, interested news agencies and other instrumentalities that show a startling willingness to serve special interest at the expense of the public interest, the ship owners of the United States and those of other countries are seeking to prevent the enforcement of this great humane act passed by the last Congress.

According to the terms of the Seamen's Law it will become operative November 4 next, as far as it affects American vessels. The part of it dealing with life saving appliances on foreign vessels will be put in effect March 4, 1916. The section of the law dealing with the freedom of the seamen, their right to quit foreign vessels, and with the standard of skill imposed by the act on all seamen is to become effective June 4, 1916.

Nothing in this measure will work any hardship upon an American vessel as compared with foreign vessels. The purpose of Congress in passing this law was to equalize the cost of operation by setting free the law of supply and demand in order to compel foreign ship owners to come up to the American standard. And Congress gave the ship owners eight whole months in which to prepare for the law.

How are these ship owners employing this time?

Take for illustration the Pacific Mail Steamship Company —most often quoted in the inspired news dispatches and business men's resolutions. The Pacific Mail, according to the claim of Mr. Schwerin, its general manager, is "going out of business." The propaganda put forth by the shipping interest asserts that it is ceasing business because of the handicaps imposed by the Seamen's Law. This is wholly and maliciously false.

The controlling interest in the Pacific Mail is owned by the Southern Pacific Railway. Two years ago Congress passed a law forbidding railroad owned ships to pass through the Panama Canal. To continue in its highly prosperous business, the Pacific Mail was forced by that law to reorganize in order to run its ships through the Canal. And it was back in February 1, 1913, at a hearing before a congressional committee that was considering the Panama Canal Act that Mr. Schwerin predicted the action that his company has now taken.

What has really happened is this: the Pacific Mail is separating itself from the Southern Pacific in order to comply with the terms of the Panama Canal Act. It has obtained estimates and specifications from the Union Iron Works of San Francisco to change its vessels from coal burners to oil burners. It has further engaged some Chinese scholars to teach part of the crews of the vessels American sea phrases. By changing from coal to oil burners the company will reduce the cost of operation of its boats. Not only, according to Andrew Furuseth, in giving to the Pacific Mail cheaper fuel, but instead of carrying 115 Chinese firemen in the hold they can with the new apparatus operate the board with 18 white men in the hold. They pay these Chinese nine dollars a month in gold. The white men will receive fifty-five dollars. In other words, to take a typical vessel, while it now costs $1,035 in wages for Chinese labor, under the new arrangement the company would operate the boat for $990 in wages per month. And there would be a further saving in operation to the extent of the difference between the food consumed by the eighteen white men and that now consumed by the one hundred and fifteen Chinamen. Furthermore, it is now a very costly operation to take on and store the coal and the coal costs more per heat unit than does the oil.

Think this over. The company is converting its ships into oil burners. It is changing their route to go into the coastwise trade through the Panama Canal. It is putting instructors upon its boats to teach those Chinese that can be profitably used an understanding of English orders in compliance with the Seamen's Law.

Robert Dollar, president of the Robert Dollar Steamship Company, who recently announced that he would place his vessels under some foreign flag, had all except two of them under the British flag prior to the beginning of the war in Europe. He took advantage of the new bill to put them under the American flag for protection, stating, however, that as soon as the war was over he would go back under a foreign flag again. But there is no flag he can go under now and be exempt from the operation of the Seamen's Act if the vessels come to American ports.

Let the reading public beware! This despicable attempt to embarrass the President of the United States in carrying out the terms of the Seamen's Law should not be permitted to succeed. It is prompted by cupidity and carried out by falsehood. Public opinion should demand that the terms of the Seamen's Law be carried out to the last letter. This great special interest should not be permitted even with the willing aid of great newspapers (and it has been shown that more than two millions of money is yearly distributed to American papers for shipping advertisements!) to deceive the American public concerning this measure of emancipation—emancipation from legalized slavery for the seamen and emancipation from dangers at sea for the traveling puplic.

Robert M. La Follette

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La Follette's Ignorance Exposed

PACIFIC MAIL STEAMSHIP COMPANY.

Office of R. P. Schwerin, Vice-President and General Manager.

At 165 Broadway, New York, July 30, 1915.

La Follette Seamen's Act.

Hon. Robert M. La Follette,
Madison, Wisconsin.

Dear Sir:—My attention has been called to an article over your signature, published in La Follette's for July, 1915, under the title, "The Ship-owners' Conspiracy."

I take it that, occupying the high office which you do in the United States Senate, you are not desirous of publishing over your signature statements which are not founded upon fact, and I realize that perhaps you have been misled in some of the information which you have published in this article through your confidence in the party or parties from whom you obtained this information.

The Hon. William C. Redfield, in an address delivered before the Case School of Applied Science, Cleveland, Ohio, states as follows:

"It must not be understood, however, that I am now making either a sweeping or a specific charge of untruthfulness or of a desire to misrepresent. I am dealing with a condition and not with persons; and a condition that brings it about that persons of unquestioned personal probity and honor constantly act and speak concerning public affairs without the precise information on which they commonly act or speak in private matters. This is not because they have ceased to be upright and truthful men, but because the standards respecting facts do not seem to be quite the same; nor is the same care always taken to ascertain the facts."

I quote this because there seem to have been so many general statements made in relation to the pros and cons of the La Follette Seamen's bill and so little attempt made by those high in authority to really ascertain the facts, or who, having ascertained them, pushed them aside because they were not desirable facts, and it is for this reason I desire to put the following facts before you.

You state in your article:

"Nothing in this measure will work any hardship upon an American vessel as compared with foreign vessels. The purpose of Congress in passing this law was to equalize the cost of operation by setting free the law of supply and demand in order to compel foreign ship-owners to come up to the American standard. And Congress gave the ship-owners eight whole months in which to prepare for the law.

"How are these ship-owners employing this time?

"Take for illustration the Pacific Mail Steamship Company—most often quoted in the inspired news dispatches and businessmen's resolutions. The Pacific Mail, according to the claim of Mr. Schwerin, its general manager, is 'going out of business.' The propaganda put forth by the shipping interest asserts that it is ceasing business because of the handicaps imposed by the Seamen's law. This is wholly and maliciously false."

Permit me to say, as an officer of this company and familiar with its policy, that the Pacific Mail cannot operate and meet its financial obligations under the Seamen's Act; therefore, it is forced to go out of business. This statement is neither wholly nor maliciously false, but is wholly and fatally true.

Further, you state:

"The controlling interest in the Pacific Mail is owned by the Southern Pacific Railroad. Two years ago Congress passed a law forbidding railroad-owned ships to pass through the Panama Canal. To continue in its highly prosperous business, the Pacific Mail was forced by that law to reorganize in order to run its ships through the Canal. And it was back in February 1, 1913, at a hearing before a congressional committee that was considering the Panama Canal Act, that Mr. Schwerin predicted the action that his company has now taken."

Congress passed the Canal Act in 1912. Before a House committee in 1912, conducting hearings upon the Wilson bill, which was introduced by the present Secretary of Labor, I testified that the Panama Canal bill would put us out of one branch of our business and that "your bill," answering Mr. Wilson and referring to his bill, which was the subject before the committee at that time, if passed, would put us out of business on the trans-Pacific Line. These hearings, permit me to state, had nothing whatever to do with the Canal bill, but were hearings upon the Wilson bill, which afterwards became known as the La Follette bill. Mr. Wilson never introduced any bill referring to the Canal. The law prohibited this company from sending its ships through the Canal, prohibited us from carrying freight between Atlantic and Pacific Coast ports, therefore, we were shut out of that business, and the Wilson bill, as I testified, if passed, would put us out of the trans-Pacific or Oriental business and it now appears that the conditions stated in my testimony are coming true. The testimony is a matter of record and if you care to look up the facts you can verify the correctness of this statement and the incorrectness of yours.

You further state:

"What has really happened is this: the Pacific Mail is separating itself from the Southern Pacific in order to comply with the terms of the

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Panama Canal Act. It has obtained estimates and specifications from the Union Iron Works of San Francisco to change its vessels from coal burners to oil burners."

Please be advised that the Pacific Mail is not separating itself from the Southern Pacific Company in order to comply with the terms of the Panama Canal Act, nor has that question in any way been under discussion, nor has the Pacific mail any intention of running through the Canal. Whoever gave you that information must have obtained it purely from his imagination.

In regard to the estimates and specifications for changing the vessels of the trans-Pacific Line from coal burners to oil burners, the following facts may interest you: I raised the sum of thirteen million five hundred thousand dollars, twelve million of which was to be expended for the building of four combined freight and passenger ships, of some 37,000 tons displacement each, and these were to be oil burners. We had four large ships in the trans-Pacific trade, which are coal burners, and in order that all the eight ships should be alike, one million five hundred thousand dollars was to be expended in changing these four ships from coal to oil and on alterations to make the four ships more modern in their passenger accommodations. This estimate was obtained in 1911. In fact, the substitution of oil for coal on the trans-Pacific Line has been under consideration by the officers of this company ever since oil was discovered in large quantities in the State of California, for unless we used large quantities of oil and could hold an adequate supply in the Orient it would not be feasible to make the change. With eight ships in operation we had a very different problem to consider.

You received some information from Mr. Andrew Furuseth, that the substitution of oil would change the 115 Chinese firemen to 18 white men and would change the cost of labor from $1,035, for Chinese, to $990 per month. As usual, Mr. Furuseth gave you misinformation. Taking one of our largest ships, the "Mongolia," she now carries:

2 white oilers at Gold $45 per month each.
18 Chinese oilers at Mex. $18 each per month.
3 leading Chinese firemen at Mex. $23, Mex. $20 and Mex. $18 each per month.
36 Chinese firemen at Mex. $16 each per month.
33 Chinese coal passers at Mex. $14 each per month.
Total monthly wage, at exchange 44, Gold $716.12.

The substitution of white men for this Chinese force would result as follows:

17 oilers at Gold $45 each per month.
9 firemen at Gold $45 each per month.
6 wipers at Gold $35 each per month.
Total monthly wage, Gold $1380.00.

These are actual figures pertaining to wages and the necessary number of men required in the engine-room and fire-room and the substitution of white crew for Chinese and you will note, even with a reduction in force through the employment of white men and the use of oil, their wages would be higher than the wages of the present Chinese force. The cost of feeding Chinese is about 11 cents gold per day; the cost of feeding a white man is about 50 cents gold per day; or, the Chinese crew and two white oilers feed for $10.90 per day and the white crew for $15.00 per day. From this it must be apparent to you which will be more costly and whether the saving which Mr. Furuseth has led you to believe exists, is correct or otherwise.

It is true that the cost of operating with oil at present is less than with coal and the saving per annum on the ship in question by substituting oil for coal, at the present prices of oil and coal, would be $69,000 and the cost of installing oil in this ship would be $57,000 and take forty working days. These figures are absolutely correct. Therefore, your statement that the company is converting its ships into oil burners is incorrect, as well as your statement that it is changing its relation to the Southern Pacific Company to engage in the coastwise trade through the Panama Canal; also your statement that the Panama Canal Act now forces this company out of business. It is hardly fair, therefore, that you should ask the reading public to beware of any statement made by a company based upon fact and neither prompted by cupidity nor carried out by falsehood. There is nothing else for this company to do, when the La Follette Seamen's bill becomes effective on November 4, 1915, except one of three things: first, operate in some other sphere, where wages do not have such a serious effect in competitive oversea trade; second, lay up the ships; third, sell the ships and liquidate the company.

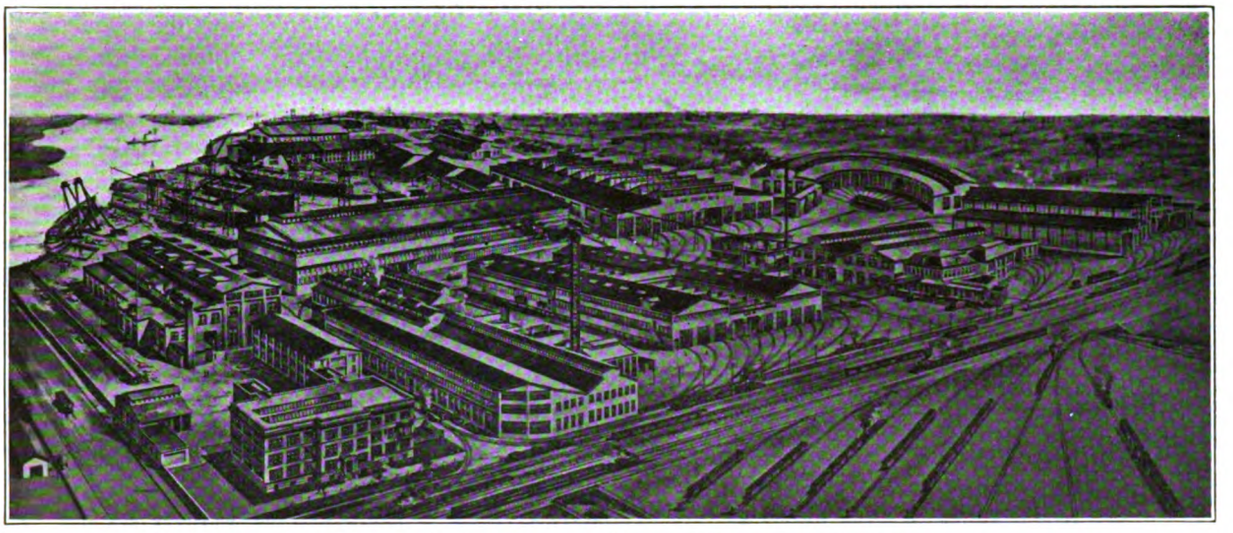
Yours truly,

(Signed) R. P. SCHWERIN.

The Seamen's Act has to cross the bows of treaties with the following countries, an operation which may be followed by a fatal collision in most cases: Austria-Hungary, Belgium, Bolivia, Brazil, China, Colombia, Congo Free State, Denmark, France, German Empire, Great Britain, Greece, Italy, Mecklenburg-Schwerin, Netherlands, Prussia, Roumania, Spain, Sweden, Norway, and Tonga. It may be presumed that no trouble will arise in the cases of China, Congo Free State and Tonga.

The torpedo boat destroyer "Wadsworth" has finished her final trials and has been accepted by the Government from her builders, the Bath Iron Works, Bath, Maine.

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A General View of the Harlan and Hollingsworth Plant

Harlan and Hollingsworth Corporation

THIS corporation, whose main offices and works are situated at Wilmington, Delaware, on the Christiana River, a few miles from its confluence with the Delaware River, will soon have rounded out its three-quarters of a century of continuous existence as builders of iron and steel ships.

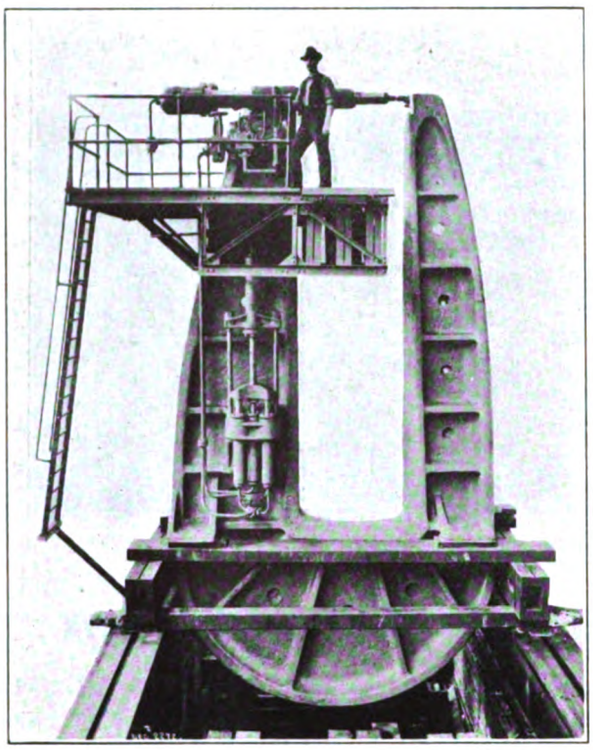
The "Bangor" was not the first iron vessel built by this concern, but the third—the "Ashland" and the "Ocean," vessels of 300 tons, having been built for Mr. George W. Aspinwall, for service between Philadelphia and New York, prior to the completion of the "Bangor." These vessels were originally intended for use through the Delaware and Raritan Canal, but, due to excessive tolls, were used in service between these cities via the outside route.

The history of the present corporation dates back, in direct line of continuous activity, to March 1, 1836, when, as Betts & Pusey, the building of passenger cars was begun on the site of the present plant. On January 1, 1837, Mr. Samuel Harlan having been admitted to partnership, the firm name became Betts, Pusey & Harlan, and on August 28, 1841, Mr. Elijah Hollingsworth (formerly associated with the Baldwin Locomotive Works at Philadelphia) purchased Mr. Pusey's interest, and the firm of Betts, Harlan & Hollingsworth succeeded to the business. Mr. Betts retired from the firm in May, 1849, and the name was changed to Harlan & Hollingsworth and so remained until July, 1858, when, by the admission of Mr. J. Taylor Gause to partnership, it became known as Harlan & Hollingsworth Company. Having largely increased its facilities, due to the great demand made upon it as builders of war and



View of Angle Shop and Bending Floor

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A Boiler Shop Plate Riveter, 18 Foot Gap, 200-Tons Pressure per Square Inch

other vessels during and following the war of 1861-64, it was deemed wise to incorporate as a stock company, and on March 14, 1867, the Harlan & Hollingsworth Company came into being and continued until January, 1905, when it was reincorporated as Harlan & Hollingsworth Corporation, it having become, together with the Union Iron Works of San Francisco and the Bethlehem Steel Company of South Bethlehem, Pa., a subsidiary of the Bethlehem Steel Corporation.

Since its beginning as the pioneer builder of iron vessels in 1843, this concern has constructed 440 iron and steel hulls, aggregating 395,737 gross tons, and embracing every style of vessel from small pleasure launches to the largest and swiftest steam yachts (the largest being the "Niagara," built for Mr. Howard Gould); river and harbor steam and ferry boats; large coastwise passenger and freight ships such as ply between New York and Portland, New York and New Orleans, Baltimore and Boston, etc.; sound and bay passenger and freight steamboats, of which the "Virginia," the "Manhattan" and the "Narragansett" are samples; coastwise lumber steamships, among which are the "Columbia," "John A. Hooper" and the "Francis Hanify," and have now under contract and construction four large oil-tank steamships (three of 8400 tons and one slightly smaller) for delivery during 1915 and the early part of 1916.

Since 1905 the works have been entirely rebuilt and modernized. A large, finely equipped central power house supplies electric, hydraulic and pneumatic power for the entire plant. Five launching slips, recently rebuilt, enable this corporation to construct vessels up to 520 feet in length. A series of large, electrically-operated tower cranes cover the launching ways and mark a new epoch in the rapid handling and assembling of material in the construction of hulls. The various buildings, chiefly of steel and brick or concrete, are modern and fully equipped with quick acting cranes and tools, electrically driven by individual motors.

A basin drydock enables the corporation to place in dock vessels up to 345 feet in length, drawing 13 feet or less.

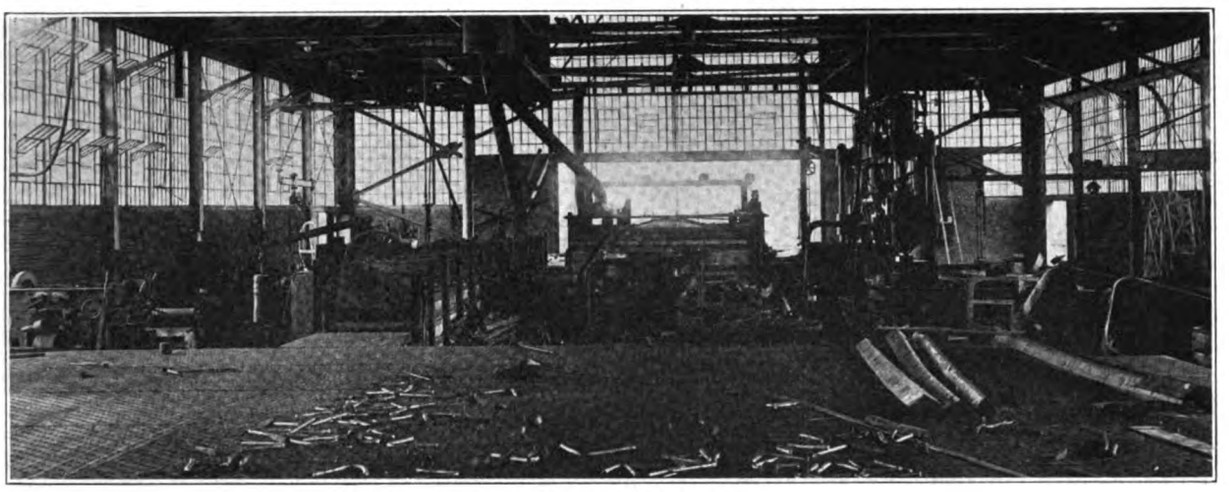
The boiler shop is one of the largest, most modern and best equipped of any in the country, and a large business is being done in the manufacture of marine boilers and tanks for outside parties, in addition to the requirements for the vessels under construction. Its reputation as builders of marine boilers, engines and ships is second to none in the country. So thorough is the equipment in all departments that this corporation is able to build and completely equip for service vessels of all types and for any service. In recent years it has established a department for the construction of modern, metal lifeboats and rafts and manufactures this type of equipment for outside parties as well as for its own requirements.

In addition to its shipbuilding plant, it has another department, equally well equipped, for the construction of first-class passenger, dining, sleeping, mail and baggage cars. Having begun in 1836 as builders of cars, it has always kept abreast of the times and is now one of the foremost builders of the modern all-steel car of the very finest description. Within the past few years the car department has been entirely rebuilt and the latest and best facilities have been introduced. The



A Corner in the Boiler Shop

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Angle and Plate Furnaces

present capacity is about 350 all-steel coaches per annum.

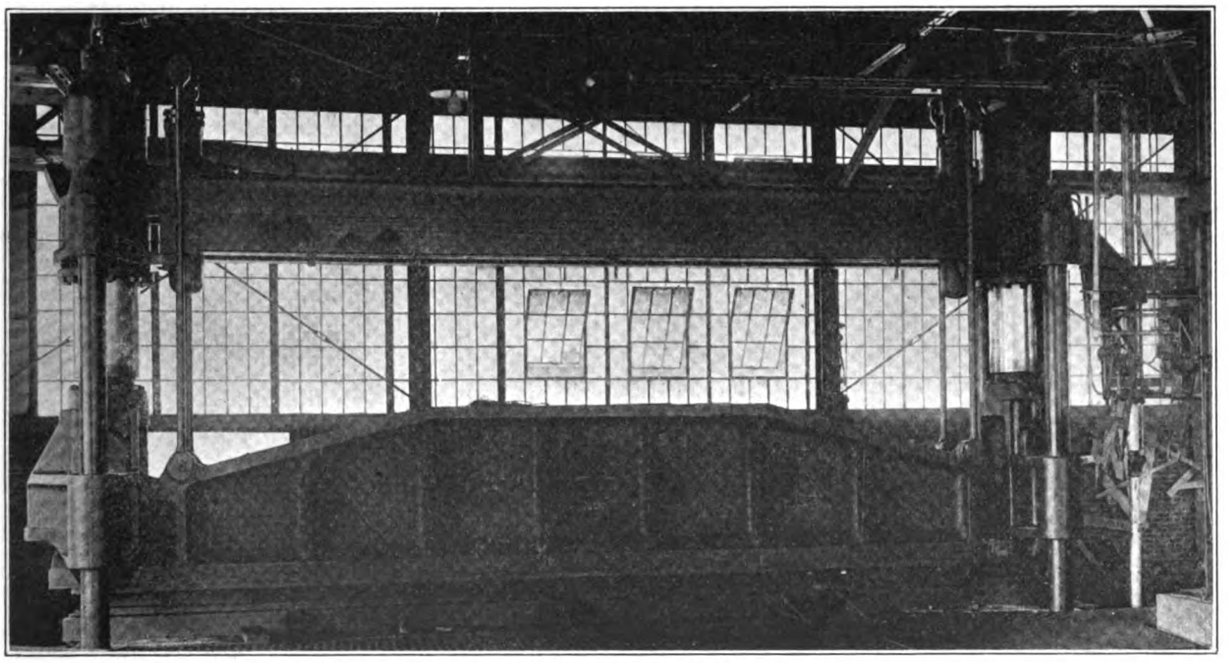
The "Bangor," the first iron seagoing propeller steamer constructed in the United States, was begun by Betts, Harlan & Hollingsworth (a predecessor of the Harlan & Hollingsworth Corporation) in October, 1843, launched in May, 1844, and delivered to her owners, the Bangor Steam Navigation Company of Maine, in eight months after the laying of her keel. She was 120 feet long between perpendiculars, 131 feet over all, 23 feet beam, 9 feet depth, 450 gross tons, 231 tons burden. Her hull was formed by bar iron ribs or frames secured by wrought iron clamps and was plated "clinker" style. She carried three wooden masts, schooner rigged, with bowsprit and jibboom, and carried a suit of eight sails.

The passengers were carried aft, in a commodious deck house fitted in a degree of elegance unusual for those days.

Her machinery consisted of independent twin-screw propeller engines having cylinders 22 inches diameter by 24 inches stroke. The propeller wheels were of the Loper type, 8½ feet in diameter.

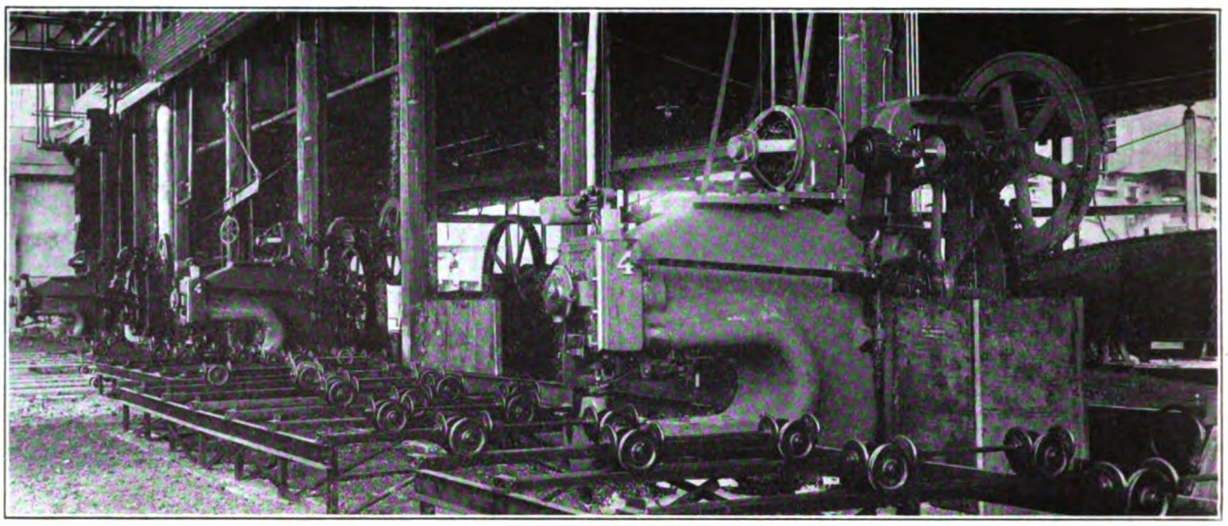
Her boiler was placed in the hold and was of iron, of the drop flue type, 20 feet in length.

Her trial trip, which was in the nature of an excursion, was from Wilmington to Cape May, returning to Philadelphia, thence to Wilmington. She carried a party of 160 ladies and gentlemen and a brass band, the ladies being given the berths and the gentlemen taking such quarters as could be improvised. The trip began at 9 o'clock one morning and Cape May Landing was reached about 3 o'clock in the afternoon. The night was spent at anchor, the return trip being made the following day without mishap. She made an average speed through the water of 11.57 miles per hour, with a steam pressure of 46 pounds. After delivery to her owners, she was used in the trade



A large Keel Bending Machine

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North Wing of the Plate Shop

between New York and Boston and Boston and Halifax until burned and beached upon the New England coast. She was afterward rebuilt and continued to run on the same line until December, 1846, when she was sold to the United States Government, renamed the "Scourge," equipped with guns and employed as a war vessel during the Mexican war. In 1848 she was sold by the Government to John F. Jeter of Louisiana, after which all trace of her is lost.

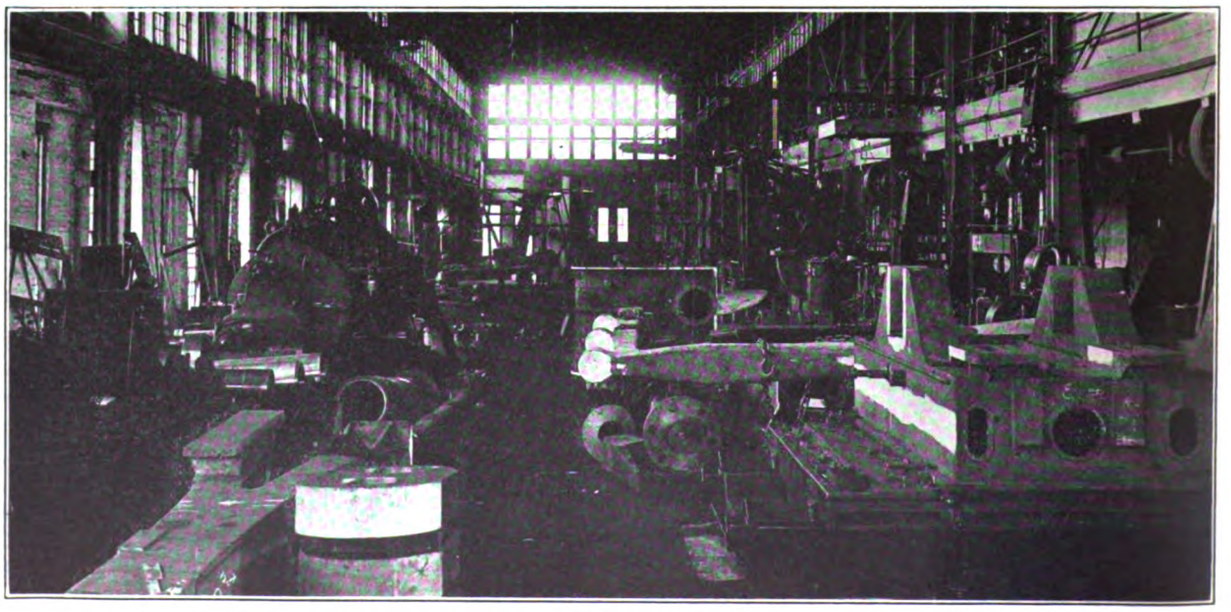
During a career of four years, this pioneer steamer shared in the pursuits of peace and war, cruised in all waters from Halifax to Mexico, served three sets of owners, was burned, wrecked, rebuilt, altered throughout and finally—oblivion—symbolic of the phenomenal and meteoric rise, triumph and decline of America's merchant marine.

Returns filed with the Bureau of Navigation show that at the beginning of the current fiscal year, July 1, 1915, the shipyards of the United States had under construction, or under contract, sixty-five steel merchant vessels of 298,426 gross tons. This is the largest amount of work under construction recorded for a number of years. The highest previous record was on July 1, 1907, when 134 steel merchant vessels of 403,473 gross tons were under construction or contract.

The steel merchant tonnage now under construction on the seaboard totals sixty vessels of 288,701 gross tons. This is greater than any previous year with the exception of July, 1901, when there were sixty-three vessels of 273,865 tons under construction.

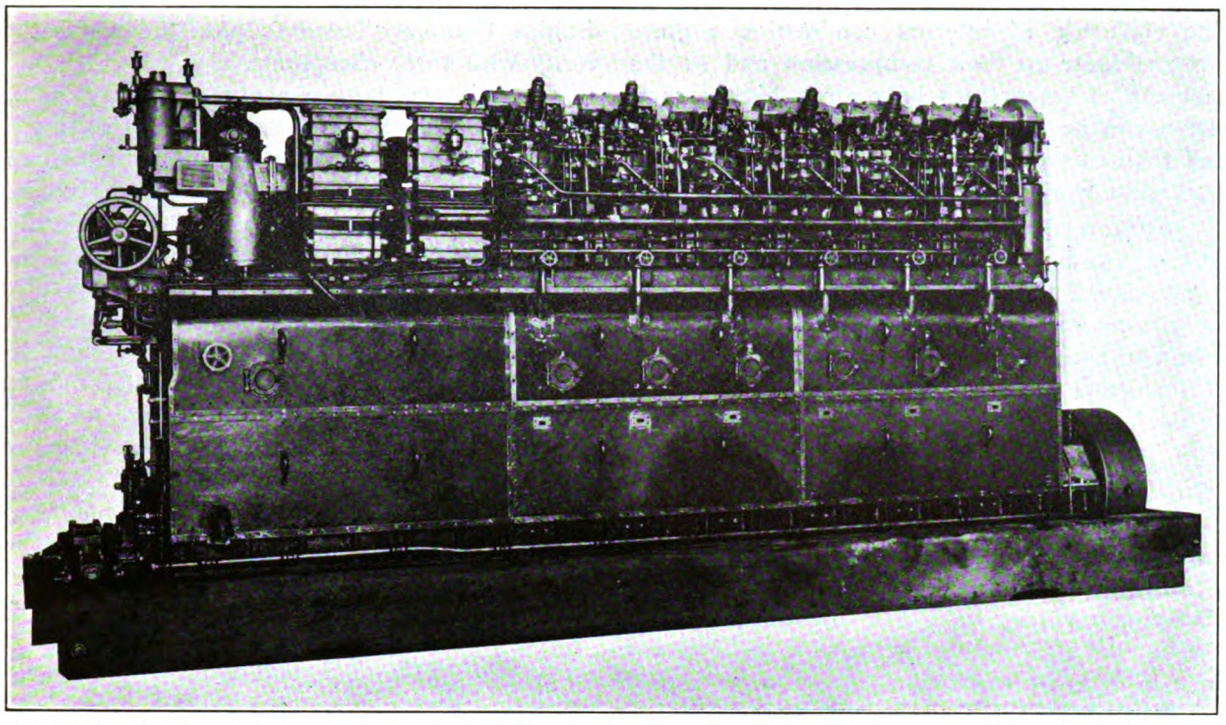
Of the vessels now building twenty-one are bulk oil carriers of 154,056 gross tons, six colliers of 25,475 gross tons and five passenger steamers of 17,000 tons, the remaining being cargo boats.

The vessels of the United States Navy under construction or under contract, excluding submarines, number twenty-seven of 287,382 tons displacement.



One of the Machine Shop Bays

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Working Side of a 420 Horse-Power New London Ship and Engine Company Diesel Engine of the Submarine Type

Diesel Engines for Submarines

TO the well informed engineer who has a knowledge of the thermal efficiency of the Diesel engine, it is often a matter of astonishment that an engine in so much favor in foreign countries has made so little advance in America. There is seemingly no definite reason for this lack of appreciation, and yet there appears to be an impression that the Diesel engine is not adapted to conditions in this country, or that it may be in an experimental stage and therefore its reliability may be questioned. We are concerned, however, with the marine Diesel engine where its application is no longer considered as an experiment.

The New London Ship and Engine Company, holders of the American rights for the M. A. N. engine, have for the past six years been building marine Diesel engines, and have built, with two exceptions (and these were imported from abroad), all the Diesel engines installed in the submarines of the U. S. Navy.

The efficiency of a submarine is absolutely dependent upon its motive power. Submarines have a radius of action of from three to five thousand miles and, as no repairs can be made at sea owing to lack of space, an unusually reliable engine is necessary. The demands for speed are constantly increasing. From eight and one-half knots on the surface it has increased to 17 knots and the latest sea-going submarine must show a speed of twenty knots.

The gasoline engine was, of course, the first motor used and as the first boats were small, from 70 to 125 tons displacement, and had no great radius of action, a 160 h.-p. 4-cycle Otto engine was used. As larger and faster boats were called for, the danger of using gasoline for fuel made the use of a safer oil necessary and in boats of the E and F class kerosene engines were specified. A modified form of the Vickers engine was developed and twelve of them were fitted. After these engines were completed, had undergone their preliminary trials, and had proven their ability to run on kerosene, the Navy Department requested the New London Ship and Engine Company to change the engines in order to burn the standard navy fuel oil. This was a point of great military value as it did away with having two kinds of fuel and enabled submarines to replenish their bunkers from any ship using oil fuel. After many modifications these engines were successfully adapted to burn Navy oil. As the Navy demanded larger boats and more powerful engines suitable for long cruises at a minimum of repairs, a medium speed, heavy duty engine was developed.

In the Diesel engine the fuel is injected after completion of compression. All of the combustible is not in the cylinder at the moment of ignition, but is fed in and burned while the piston is in motion. The combustion takes place during an appreciable change in the cylinder volume. In a gasoline engine the fuel and air used is mixed outside the engine before compression and all the mixture is in the cylinder at the moment of ignition.

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The efficiency of internal combustion engines is proportionate to their compression and as the Diesel engine compresses only air a higher compression can be used and a greater efficiency obtained than in gasoline engines, where too high a compression would result in premature explosion.

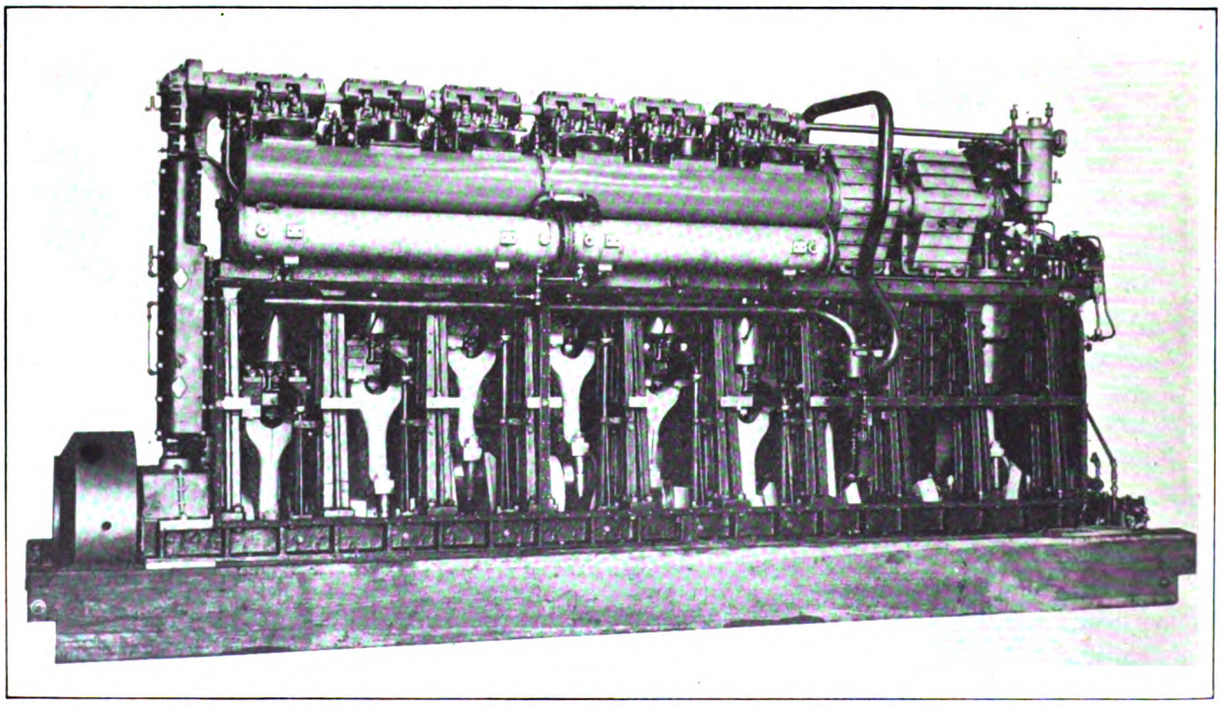
As not more than 15% of the displacement of a submarine can be devoted to engines, pumps, shafting, propellers, etc., it becomes necessary to develop the maximum power with the minimum of weight and space and this is where the designer's skill manifests itself in judicious distribution of material.

With the condition of great power at a minimum weight, it appeared at first that the two-cycle engine would prove most satisfactory. The difficulty experienced was with the greater number of heat units necessarily passed through the cylinder walls by the cooling water system. Consequently cylinders are alternately subjected to a great change of temperature, and as these engines normally run at 450 revolutions, it is evident that a cylinder goes through a cycle of this sort about 7½ times a second. It must be also borne in mind that the reversing of the engine is accomplished by the admission of cold air to the cylinders, which in turn subjects them to still further strains. We therefore have a condition of the interior skin expanding owing to the temperature of the cylinder and of the exterior skin retaining its original dimensions owing to the temperature of the cooling water. As an example of the troubles experienced in securing the proper grade of iron, it might be cited that the first hundred cylinders machined by the New London Ship and Engine Company failed to pass the test satisfactorily with three exceptions.

The military requirements of to-day call for submarines of two types, namely, Cruising and Coast Defense. The cruising type is of high speed and of great radius of action, while the coast defense is of smaller size and of less speed and radius of action.

The Electric Boat Company has received the contract for the construction of the "Schley," the largest submarine in the world. The engines for this vessel will be built by the New London Ship and Engine Company and are of a type radically different from the engines previously constructed. For the coast defense boats a new four-cycle engine has been developed. This type of engine is somewhat more economical in fuel consumption, is simpler in construction and will not require for its operation as well trained a personnel as the engines in the larger boats. Aside from their military value they will be of great service to the engineering personnel as a stepping stone in the construction and operation of Diesel engines.

"We transferred two of our British steamers shortly after the bill allowing the placing of foreign tonnage under the American flag was passed, but we fear that if the Seamen's law in its present form is allowed to go into force on November 4, we shall be under the necessity of changing the flag of these steamers, much as we dislike to do so, or else be forced to allow our competitors to take away some of our business."—Mr. F. C. Munson, Vice-President of the Munson Steamship Line.



Exhaust Side of the NLSECO Submarine Type of Diesel Engine

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The Boat Deck Promenade Presents a Fine Open-Air Dancing Deck

The "Northern Pacific"

The passenger and freight service up and down the Pacific Coast of the United States in point of size of ships, comfort of travel, luxuriousness of appointments and cheapness of transportation, leads any coasting service in the world, and many of the ships employed have all the dignity and ability of trans-oceanic liners. The latest additions to the coasting trade, the Great Northern and Northern Pacific, have now taken their definite place on the northern run and are making a successful bid for a goodly share of the public patronage.

The "Northern Pacific," some interiors of which are shown herewith, is 524′ 0″ long over all, 500′ 0″ between perpendiculars, 63′ 0″ beam and 50′ 8″ deep to "A" deck. At 21′ 0″ draft she has a deadweight carrying capacity of 2185 tons, a cubic cargo capacity of 200,000 cubic feet, shaft horse-power 25,000, a cruising speed of 23 knots and accommodations for 550 first-, 108 second-, 198 third-class passengers and 198 of a crew. The registered gross tonnage is 8255. Steam is supplied by twelve water tube boilers arranged in two boiler-rooms, six in each. These boilers are oil fired and the contract called for sufficient steam for 23 knots on ten boilers, two standing by as spares. The fuel oil is carried in wing bunkers alongside the fire rooms, a similar arrangement to that on the Pacific Coast Steamship Company's steamer "Congress." There are ten transverse water-tight bulkheads extending to "D" deck or higher and dividing the hull into eleven main water-tight compartments. In these bulkheads there are no doors below the line of "D" deck except the shaft alley and fireroom doors, which are operated on the Stone-Lloyd system of bridge control. In conjunction with her wing bunkers extending the full length of the boiler-rooms and a deep double bottom extending from peak to peak, these bulkheads render the "Northern Pacific" a very safe ship.

Boilers.

Steam is supplied at 220 pounds working pressure by specially designed water-tube boilers of the Mosher type constructed by the Babcock and Wilcox Company. They are arranged in rows of three facing the center of the ship, and providing a central fore and aft fireroom 11′ 2½″ wide by 65′ 0″ long. The total space occupied by the boilers is 130′ 0″ by 41′ 6″. Each of the twelve boilers contains 5,000 square feet of heating surface. The steam-drums are 54″ in diameter with heads bumped to the same radius. Each boiler has 969 generating tubes 2″ in diameter of No. 8 B. W. G. Their ends are expanded into the steam and water drums. The boilers operate under forced draft on the closed stoke-hold system. Three Sturtevant

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turbo-blowers are located in each fireroom. The turbines are direct connected to 34" high speed cone fans and each unit delivers 30,000 cubic feet of free air per minute against a pressure of 2" of water. These units operate at 180 pounds steam pressure and are equipped with emergency safety governors. Two of the units in each fireroom are sufficient to supply draft air for full power, the third being a standby. The Koerting mechanical oil-burning system supplied by the Schutte, Koerting Company is used. The oil fuel is taken from the storage tanks and on its way to the fuel pumps passes through duplex suction strainers and then passes through a superheater using live steam. The burners are of the centrifugal spray type fastened to adjustable air registers. The products of combustion are carried off by two stacks, each serving six boilers, whose tops are 112 feet above base line.

Main Engines.

The propelling machinery consists of one high and two low pressure Parsons turbines arranged on three shafts and capable of developing 25,000 horse-power at 325 revolutions. Steam from the boilers is supplied through two main pipes connecting to the inlet belt of the high pressure turbine and also to the inlets of the two low pressure turbines for maneuvering purposes. Astern turbines are incorporated in each of the low pressure turbines, and the steam connection to the astern turbines and the low pressure ahead turbines lead from a double maneuvering throttle at the working platform, so arranged that in maneuvering ahead or astern both valves will be operated from a hand wheel. The main steam connection to the high pressure turbine is controlled by a single balanced throttle valve at the working platform.

The high pressure turbine is 21' 7½" long, the outside diameter of the rotor drum being 5' 8". The cylinder is of close-grained cast iron and the rotor drum is a steel forging. The wheels are of cast steel annealed and the shaft of open hearth forged steel. There are four stages of expansion with sixteen rows of blading in each stage. The diameter of the rotor at the tips of the blades of each stage is 5' 11", 6' 0¼", 6' 2" and 6' 4½". The total length of each of the low pressure ahead and astern turbines is 32' 2", the low pressure drums being 7' 8" outside diameter and the astern drums 6' 7" in diameter. The line shafting is 12¼" in diameter. Lubrication of the turbine thrust and spring bearings is carried out at a pressure of 10 pounds, oil being supplied from a 2,000-gallon gravity tank. This tank is supplied by two steam-driven pumps which draw from the inner bottom or from drain tanks. Two oil coolers of the quadruple flow type and having a cooling surface of 360 square feet are utilized for cooling the main engine lubricating oil. The two main condensers each have 13,046 square feet of cooling surface. An auxiliary condenser is provided for port use. There is one air pump for each condenser of the twin beam, vertical, single-acting type, supplied by the Blake and Knowles Steam Pump Works, with air cylinders 32" in diameter, steam cylinders 14" in diameter and a stroke of 21". The auxiliary air pump is of the vertical simplex featherweight type 7½" by 14" by 10". The cooling water for each condenser is furnished by a 26" engine-driven centrifugal pump.

There are two feed water heaters of the Reilly multicoil type furnished by the Griscom-Russell Company. Each of these heaters can handle 150,000 pounds of feed water per hour to a discharge temperature of 208 degrees when furnished with steam at 5 pounds pressure. There is also a Reilly multicoil horizontal Navy type evaporator 4'-4" diameter by 6'-7" high, capable of furnishing 25 tons of fresh water per day.

There is a complete CO2 refrigerating plant, manufactured by J. & E. Hall Company, Limited, consisting of two No. 9 machines for refrigerating one cargo hold and the ship's stores. There are two hot water generators, one for fresh and one for salt water service. These are of the straight tube multi-pass type manufactured by the Griscom-Russell Company. Each unit has a capacity of 150 gallons of water per minute heated from 50 to 130 degrees with steam at 5 pounds pressure.

Electric Plant.

The electric plant consists of four 35-K.W. 110 volt generators furnished by the Diehl Manufacturing Company, direct connected to Terry type "GM" turbines manufactured by the Terry Steam Turbine Company. The turbines are designed to operate normally with 200 pounds steam pressure with a 28" vacuum, although they will carry the required load with 175 pounds of steam and a 26" vacuum and are capable of operating at an initial pressure of 220 pounds. The normal operating speed of these sets is 3200 revolutions per minute. This plant supplies current for lighting the ship, operating five freight elevators, a Willets-Bruce automatic whistle, dishwashing machines, fruit paring devices, polishers and buffers and numerous other pantry and kitchen devices.

The steam steering gear, windless, capstan and hoisting winches were all furnished by the American Engineering Company of Philadelphia. The steering engine is of the differential type with cylinders 14" in diameter by 14" stroke, controlled by an automatic reverse valve. The steering en-

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The Colonial Dining-Room of the "Northern Pacific," Showing the Utilization of the Deep Web Frames to form Attractive Alcoves



The Glass-Enclosed Promenade is a New Departure in the Coasting Trade which is Welcome on the Northern Runs



Sitting-Room of a Private Suite, Showing the Decorative Effects of a Fire-Place

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gine can be operated directly at the engine itself or by telemotor from the wheel house.

Deck Auxiliaries.

The steering gear on the "Northern Pacific" is of the Williamson differential type with cylinders 14" in diameter by 14" stroke. The differential type steering gear serves the double purpose of saving steam consumption by the steering engine and obtaining a differential leverage, increasing as the rudder is moved away from its amidship position into areas of greater resistance to the water, the differential link connection between the rudder head and quadrant giving more power as the rudder approaches the hardover position and less power and quicker action with the rudder amidship. Consequently, the ship responds more quickly to the helm. This steering engine is controlled from the pilot house by the Williamson pilot house type of telemotor. There is also a hand screw emergency steering gear fitted on each of these vessels for use in case the steam steering gear is out of commission.

The windlass is of the "Providence" spur geared type and has 10x10" double cylinder reversing engines and wildcats suitable for handling 2½" studlink cabin. This spur geared type of windlass is much more efficient than the worm-geared type and greater speed and power can be obtained for handling the anchor chain even with a smaller engine. By placing the warping head on the auxiliary shaft, a much greater speed is obtained for warping ship than in the worm-geared type of windless where the warping heads are on the end of the wildcat shaft. This is a very desirable feature.

For handling freight and operating the booms, each ship is equipped with four double cylinder, single drum spur geared reverse valve hoisting engines with cylinders 8" in diameter by 10" stroke. Each hoist is equipped with one 15" gypsy head. These hoists are arranged in pairs with right and left hand operation, so that one operator can control two hoists.

On the boat deck, aft of the pilot house, is located a hoisting engine with shaft extending across the deck. On each end of the shaft is mounted a double winch head for handling the rope used in lowering or raising the ship's boats. These hoists are of the double cylinder spur-geared type with reverse valve engines, having cylinders 8" diameter by 10" stroke. These hoists are not fitted with a rope drum.

There are four dock type steam gypsies with gypsy barrels 16" in diameter at the smallest part, operated by 8x8" double cylinder, non-reversing engines through worm gearing, making very powerful machines.

There are four 40 H.P. electric elevator hoists having single drums and being compound geared to give a capacity of 13,000 pounds at 100 feet per minute through a two-part purchase. The motor is compound wound for 110 volts direct current, of the semi-enclosed type fitted with standard solenoid brake.

The hoist is also equipped with a traveling cam limit switch, so designed as to stop the elevator at the limit of travel. The motors are operated through a drum controller and contactor panel, designed for a variation of speed of 50 per cent. below normal.

Passenger Accommodations.

The outstanding feature of the passenger accommodations on the "Northern Pacific" is the fact that one entire deck is practically given over to the public rooms and promenade for first-class passengers. Above this deck is the boat deck which is reached by the passengers from the after grand stairway. The boat deck has a house forward containing the captain's and officers' quarters and above this again is the wheel house and chart room. The bridge is enclosed after the fashion of the large Atlantic liners. On the highest passenger, or "A" deck, from forward aft will be found the following: On the deck forward are located a 10" by 10" windlass and two 8" by 8" capstans. Immediately aft of number one hatch is a deck breakwater, aft of which is the foremast and four 8" by 10" cargo winches. At the forward end of the superstructure is a curved steel bulkhead which divides the first-class quarters from those occupied by the third-class passengers and crew. For 125 feet aft of this shield the promenade is enclosed with sliding glass windows, giving protection from the cold winds. Within this inclosure are located the main lounge, observation room and lobby. These rooms are all in the colonial style. The color scheme in the observation room is green and old ivory and in the lounge there are old rose carpets and tapestries. Both these rooms have large and attractive skylights. The lobby serves as a main entrance to the hotel part of the ship and is at the head of the forward grand stairway leading down through four decks to the main dining saloon. Aft of the first-class lounge and abreast the engine-room hatch are 14 bachelor apartments arranged in groups of two state rooms with private toilets and shower baths between. Further aft on "A" deck is the first-class smoking room, finished in natural oak. The floor is of Dreadnought tiling of soft, warm colors harmonizing with the russet brown leather furniture. A large open fireplace adds to the cheerfulness of this apartment. Just abaft of the smoking-room is a deck verandah with glass sides and the after end open to the weather.

At the extreme forward end of "B" deck is the third-class dining-room, aft of which is a large open space through which the hatches to number one and two holds are trunked. This contains the

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The Colonial Smoking-Room on the "Northern Pacific"

third-class lavatories. From frame 48 aft to frame 157, "B" deck is given over to first-class state rooms and suites consisting of bedroom, sitting-room and bath. Aside from the suites, the rooms are finished in white enamel, with doors and chair rails of mahogany. The hallways and lobbies throughout the passenger accomodations are laid in Dreadnought tiling and rugs. Aft of frame 157 are the second-class public rooms, consisting of smoking-room, lobby and lounge. These rooms are handsomely furnished and completely surrounded by the second-class promenade. At the extreme after end of this deck are located two warping capstans and a hand-steering gear. The public lavatories, baths and showers for men and women on this deck, as well as on the deck below, are located amidships between the two uptake casings.

Forward on C deck are quarters for third-class passengers, sailors' mess and quarters, as well as quarters for some of the steward's kitchen crew.



The Music-Room is a Feature of the Long Expanse of Public Rooms on "A" Deck

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The Writing-Room on the "Northern Pacific"

The first-class accommodations on this deck are similar to those on the deck above both as to appointments and arrangements, but there are no suite rooms on "C" deck. The purser and chief steward have rooms on this deck adjacent to the forward stairway. Aft on "C" deck are located second-class quarters, rooms for the engineering officers' quarters and messrooms for the steward's crew and firemen.

Forward on "D" deck are berths for 130 third-class passengers and aft of this is the main dining saloon, seating 278 at four-, six- and eight-chair tables. This apartment is in the colonial style with side alcoves formed by building up partitions on the necessary deep frames. The ports are hidden by inner latticed windows. The dining-room floor is in Dreadnought. The room is finished in white enamel, the tables and chairs being of mahogany. Immediately aft of the first-class dining-room and located directly between it and the second-class saloon are the kitchen and pantry. These important features of the ship have been carefully worked out. The ventilation of the galley and pantry is accomplished by means of



The Main Lounge, Showing Skylight and large French Windows

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heavy exhaust fans capable of changing the kitchen and pantry air every two minutes and the dining-room atmosphere every seven minutes. The extensive heating and ventilating system throughout the first and second-class quarters is operated on the thermotank system.

A complete Aero fire alarm system has been installed, including cargo spaces as well as all passenger rooms, lockers, etc. There are three centrals or cabinets from which the copper tubing of the system radiates and alarms are given independently by any one of the three groups of circuits. In other words, should a fire break out aft it would be caught by one of the after circuits and the alarm would be given at the after cabinet, in the pilot house, and in the engine-room, but no place else. This would enable the fire to be dealt with in its incipient state without danger of unduly alarming either passengers or crew.

All the stateroom bulkheads throughout the "Great Northern" and the "Northern Pacific" are constructed of "Nevasplit" paneling 7/16" thick, supplied by the Keyes Products Company of New York. In all about 30,000 feet of this paneling was required for both ships. Below the weather deck, the steel decks are covered with from 2 to 3 inches of "Litosilo," a composition that does not absorb moisture to the extent of a wooden deck, and which is thoroughly durable.

The "Northern Pacific," like her sister ship, the "Great Northern," is a product of the William Cramp & Sons Ship and Engine Building Works of Philadelphia.

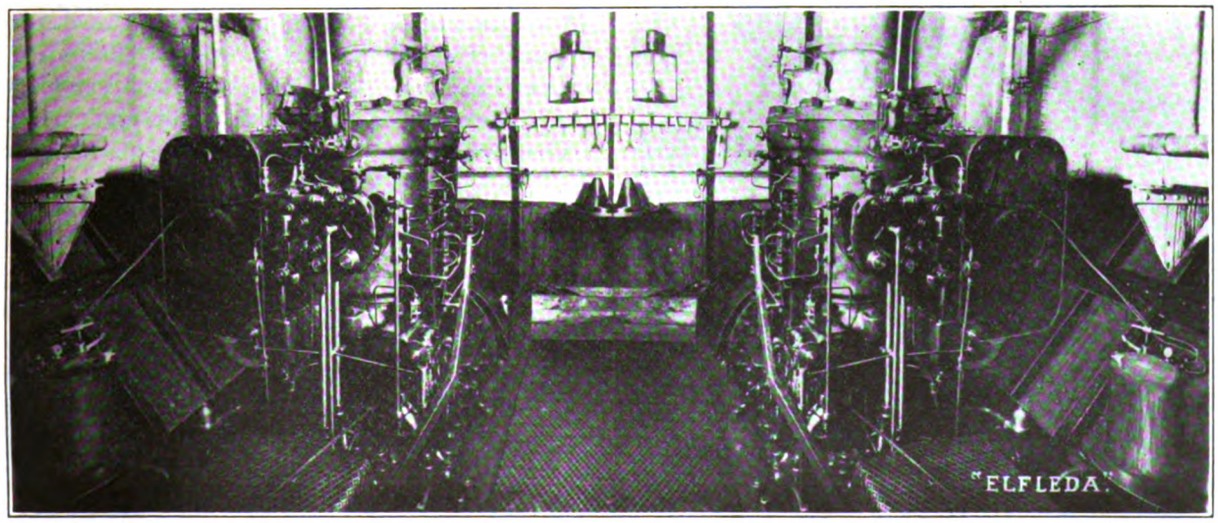
Oil Engines as Auxiliaries

AT the time when oil engines were in the experimental stage and the tried and trustworthy steam engine dominated the ocean, the stately sailing ship was looked upon as a thing of the past. The success of the internal combustion engine has, however, furnished a new source of motive power that is admirably adapted to the needs of sailing vessels and it would appear that the "ship" is showing indications of coming once more into prominence, this time as an auxiliary.

There have been constructed lately oil engines of large sizes which, as far as reliability and economy are concerned, do not call for any further wishes. A great number of sailing ships equipped with oil engines are to-day running all over the seas. Strange to say, there are very few such sailing ships owned in Sweden, notwithstanding the fact that the largest crude oil engine factories are to be found there. It can be noted with satisfaction that a great number of these foreign sailing ships have been and are being provided with oil engines of Swedish origin, while it must be regretted that the Swedish sailing ships still to be found are almost as obsolete to-day as fifty years ago.

A visit to the most prominent firm in this branch, Bolinders Company, affords an opportunity to study oil engine manufacture more clearly. These engines are manufactured as a specialty and about 60,000 horse-power of oil engines are being turned out per annum and 11,000 such engines are to-day in use all over the world.

The Bolinders establishment, which is one of the oldest concerns at Stockholm, is an imposing and at the same time interesting structure. The development of this factory can almost be followed by looking on the various buildings and shops belonging to the concern. The most noteworthy shop, however, is the one containing the oil engine factory, which is the largest of its kind in Scandinavia.



The Engine Room of the "Elfleda" illustrates the Small A mount of Room Required for an Auxiliary Power Installation

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It is here the manufacturing of all the various engine parts is being performed by means of special machine tools that perform the work as near as to 1/100 of a millimeter. This makes parts of the engine interchangeable, which again enables any broken part to be replaced. Such parts are carried in stock not only at Stockholm but also in most of the larger cities the world over.

The engines having been erected are brought down to the lower floor, where very minute testing and adjusting operations are performed. This part of the work is accomplished by means of the most modern and very best testing tools and instruments.

From the test room the engines are transferred to the packing and store department, to be distributed to the various parts of the globe. One meets them later not only all over Sweden and Europe, but on the Alpine lakes of the Andes, in the darkest corner of Africa and on the Steppes of Asia.



The "Elfleda" is a Handsome, Well-Found Craft

Exact figures on the number of sailing ships with engines as auxiliaries are hardly possible to give, but their numbers has quite recently been worthy of respect, as shipowners have become alive to the business a ship with such an installation will create. Of course, she is able, irrespective of weather and winds, to make her grip within a fixed time, which enables her owners to obtain better freight rates. They are when visiting harbor equal to steam ships and can have their turn when loading and unloading their cargoes, also when docking. All towing charges are dispensed with. Time is gained when working the cargo by means of the power available for winches and pumps. Greater safety for the ship when in bad weather and dangerous waters. A few instances are at hand under the present favorable conditions on the freight market the whole equipment has been paid for by one single journey.

Another auxiliary sailing ship with a Bolinders engine, the four-masted steel bark "Fingal," belonging to the Transatlantic Motor Ship Co., had her trial trip on Tuesday, June 8, from Framnaes Works, Norway. After having had installed two Bolinders engines, each of 160 brake-horse-power, the trial trip developed excellently in all respects, and the results surpassed all expectations. They were able to get the speed of 7.5 knots against a very brisk breeze.

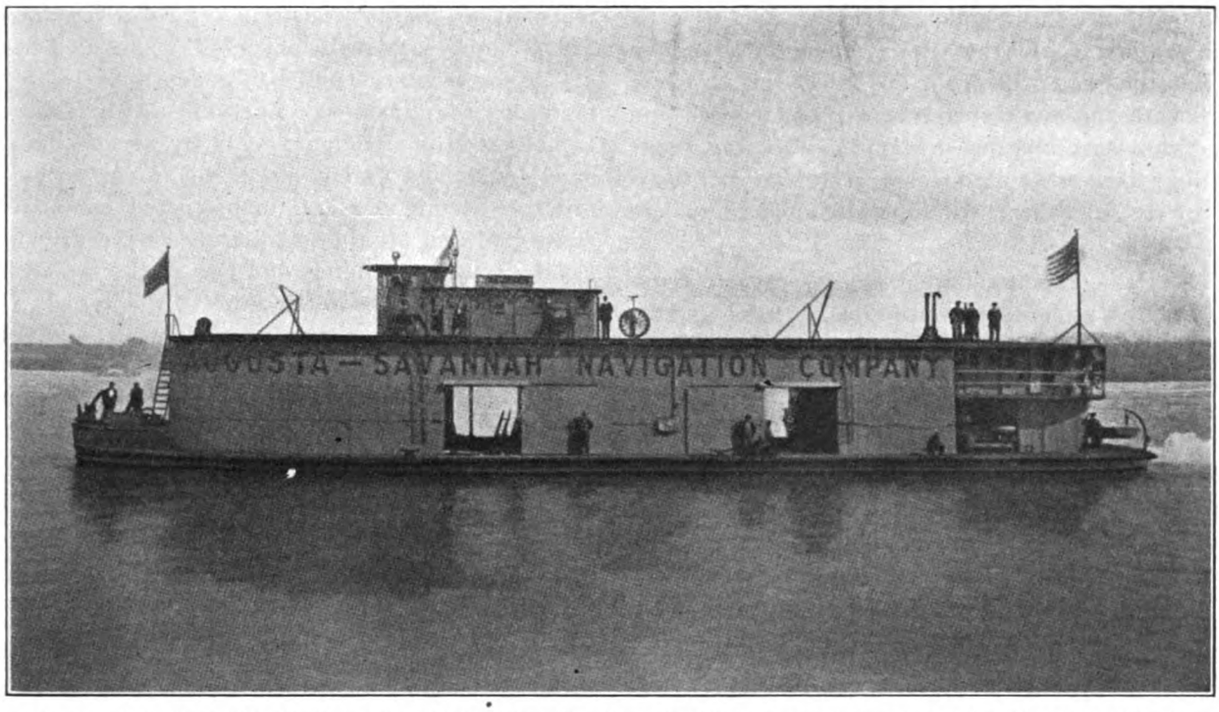
These results derived from 320 horse-power are astonishing, as the "Fingal" is a ship of 2435 tons net and has a large rig. Apart from this the ship had ballast of 1500 tons. The engines ran immediately after having been started up and one could not notice any vibration. The engines were very easily maneuvered from full speed ahead to full speed astern in seven seconds.

The engine-room occupies very small space, about 3 to 4 per cent. of the ship. The exhaust is taken up so that the working of the engines is hardly noticeable. This, as well as the complete absence of vibration, indicates that Bolinders as well as Framnaes have delivered a solid and sound job in regard to engines and installation.

The installation of the engines commenced on the 25th of May and was completed in four days. The engine-room is very complete and yet simple.

A comparison between a sailing ship with an auxiliary engine and a freight steamer will give an absolute preference to the sailing ship. The average speed has proven to be about the same in both cases for one journey. The loading capacity is in favor of the sailing ship, the weight and the space of the oil engine equipment being considerably less. Initial cost, running costs and depreciation are less and when idle there are no costs for "raising stern" or "stand-by losses".

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River Freight Barge "Richmond," Operating Between Augusta and Savannah, Georgia, Fitted with Two "Wolverine" 75 H.-P. Engines and One 150 H.-P. Gas Producer Plant

PRODUCER GAS RIVER BARGE "RICHMOND."

The illustration of the riger freight barge "Richmond" is of particular interest because it represents an important phase of motor workboat development.

The "Richmond" is a fireproof steel barge, 150 feet long and 30 feet beam, having a mean draft, when running light, of but 24 inches; 125 tons of freight are carried with a draft of but 31 inches; 320 tons of freight on a 4-foot river. The tonnage of the barge is 568. The hull is divided into five or more watertight compartments. Solid freight is all carried above the deck. There are two freight compartments, each 52 feet long by 26 feet wide, and the clear headroom in the freight space is 15 feet.

Propulsion is by two 75 h. p. "Wolverine" heavy duty marine engines. Each engine drives a propeller wheel in a tunnel in the stern. The distance between the two motors and between the two tunnels is about 12 feet. Gas is supplied to the engines by one 150 h. p. marine gas producer built by A. L. Galusha & Co., Boston, Mass. About 150 pounds of coal is the total amount of fuel used per hour by the gas producer to make gas for the two engines. The fuel consumption running full power 24 hours a day for about four and a half days a week and for operating and manipulating about crowded docks, picking up freight, most of the remaining two and a half days in each week, is from eight to eleven tons.

Steam plants on boats of even less size and of the stern-wheel type take up more than twice as much space, fore and aft, and leave but half as much enclosed freight space. The steam plants also require several times as much fuel, for which additional weight and bunker space provision must be made.

There is a first-class stern-wheel steamboat operating on the same line, also making one trip weekly. She is slightly shorter in length and has but one-half as much enclosed freight space, yet she consumes 25 tons of coal and 10 cords of wood a trip as against 8 to 11 tons total fuel consumption on the producer gas barge.

The remarkable compactness of the power plant is indicated by the overall dimensions from the rear of the after freight-room to the after side of the gas-producer. In this space of but 16 feet fore and aft is the engineroom and the gas producer. In the engine room there are placed in addition to the engines, bilge pumps, air compressor, storage batteries for electric lights and high-powered searchlight, a 10-k.w. electrical generator, and a fire-pump capable of delivering two streams for 1-inch nozzles.

The "Richmond" has a speed of between three and a half and five mlies an hour against the current and of nine or ten miles with the current. The owners are much pleased with results. At the present time they are building a sister barge the "Chatham."

The handling of freight between Augusta and Savannah, Ga., a 250 to 300 mile run, is the exclusive use of these barges. The Savannah river is extremely crooked, there being sharp reverse curves

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and swift cross currents. At times the river is very shallow. At other times, there is a sudden rise in the water of from 20 to 30 feet. These rises, with the swift currents, will occur once and sometimes several times a month. Floating snags and logs are very common. A craft that can operate successfully here will operate most anywhere on inland waters.

The engineers state that it is very easy to operate the power plant on continuous runs as long as 87 hours without a stop in rough flood time. They also state that the engines are manipulated on producer gas about crowded docks, picking up freight with the greatest ease, and can be handled from dead slow up to high speed without trouble.

The general manager of the transportation company states:

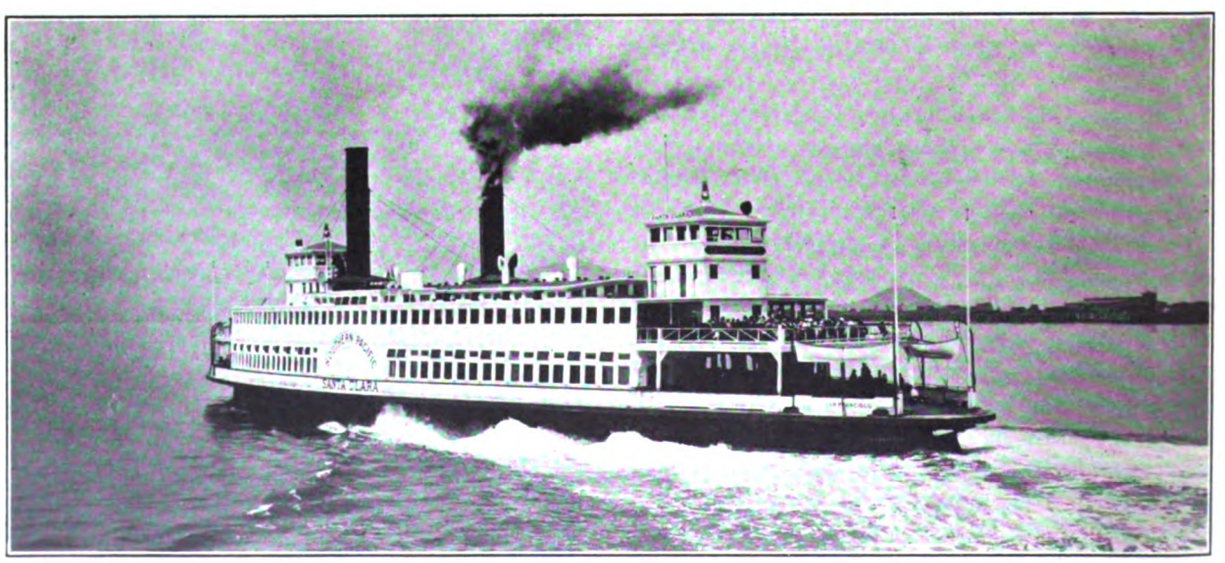
"This boat has repeatedly been under power for continuous periods of from 50 to 80 hours and there is every indication that practically continuous use of the producer is in every way possible. The outfit has been working for weeks without any indication of trouble and without the necessity of drawing the fire, and during all of this time the producer has either actually been supplying gas to the engines or has been standing by ready for immediate service."

THE "SANTA CLARA."

The latest addition to the Southern Pacific's fleet of bay ferries, the "Santa Clara," brings the number of regular passenger ferry steamers up to twelve. The "Santa Clara" marks the highest refinement in the building of ferries and with her sister ship, the "Alameda," has attracted considerable attention among engineers and naval architects. The "Santa Clara" is 292′ 4″ over aprons, 273′ 0″ long over stern posts, 42′ 0″ molded beam, 75′ 4″ over guards and has a depth of 17′ 3″ to main deck amidships. The hull is divided into eight watertight compartments by seven complete steel bulkheads extending to the main deck. In order to assure a clear unobstructed cabin space right fore and aft the paddle wheels are driven by separate sets of engines and the stacks are carried up through casings on the sides of the vessel. The four driving engines, two on each wheel shaft, follow railroad practice more closely than is usually found in boats of this character, the machinery having been constructed in the railroad shops. The steel work of the vessel was assembled at the East Oakland shipyard of the Southern Pacific Company where the wood finish was also gotten out and fitted to the steel frame of the deck structure. The "Santa Clara" has seating capacity for 1,845 passengers, both her upper and lower cabins being very commodious. The interior woodwork is in mahogany and the shipyard has turned out a splendid piece of woodwork on this job. Steam is supplied by a battery of Babcock and Wilcox boilers using oil as fuel. The "Santa Clara," like her sister ship, is very fast and has served to accelerate the Oakland-San Francisco service by several minutes.

THE "MELVILLE."

The U. S. torpedo boat destroyer tender "Melville," built by the New York Shipbuilding Company, is a handsome business-like craft resembling a merchant steamer closely if it were not for her battery of eight 5″ rifles and two 3-pounder saluting guns. The general particulars of the vessel are as follows: Length between perpendiculars



The "Santa Clara," the Latest Type of Southern Pacific Ferry Steamer. In this Class of Vessel, San Francisco Leads the World

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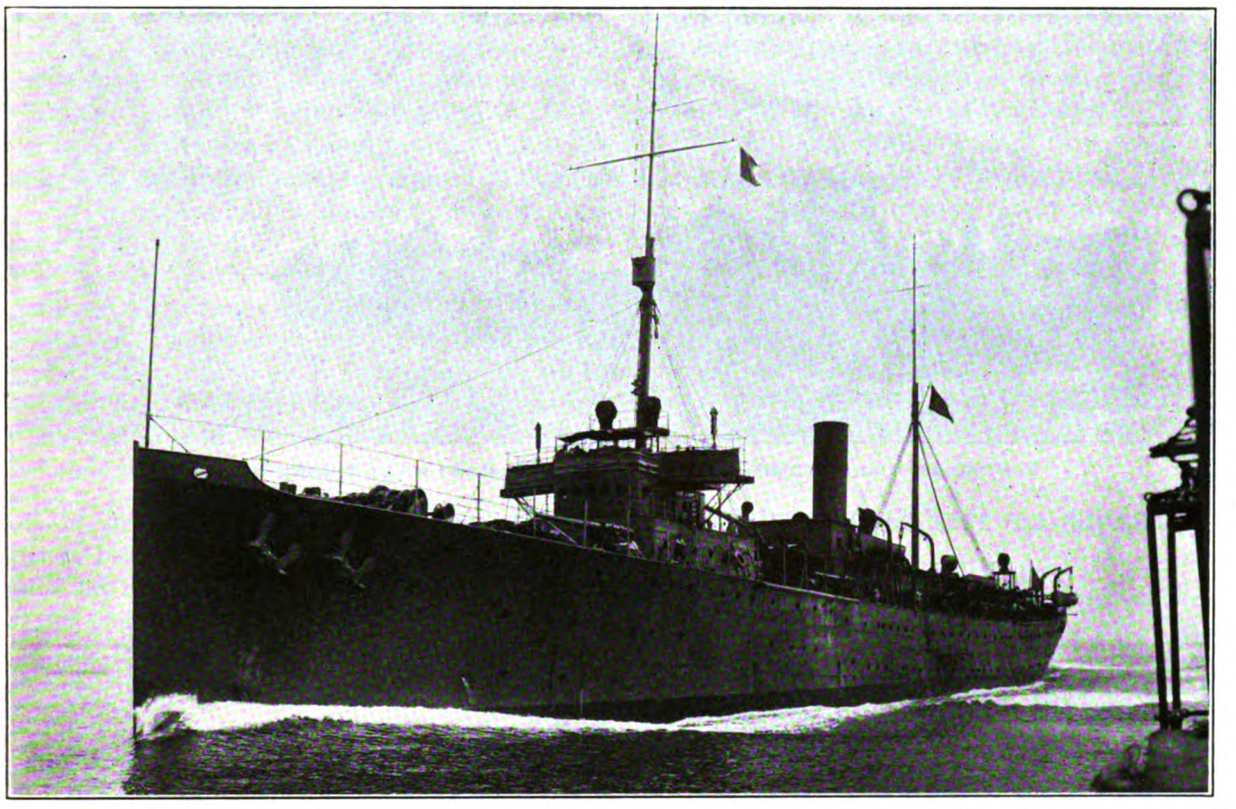


Photo New York Shipbuilding Company

Torpedo Boat Destroyer Tender "Melville" on Trial

400′ 0″, beam 54′ 5½″, depth 20′ 0″ displacement 7,150 tons, oil fuel capacity 900 tons, speed 15 knots, total horse-power of main turbines 4,000.

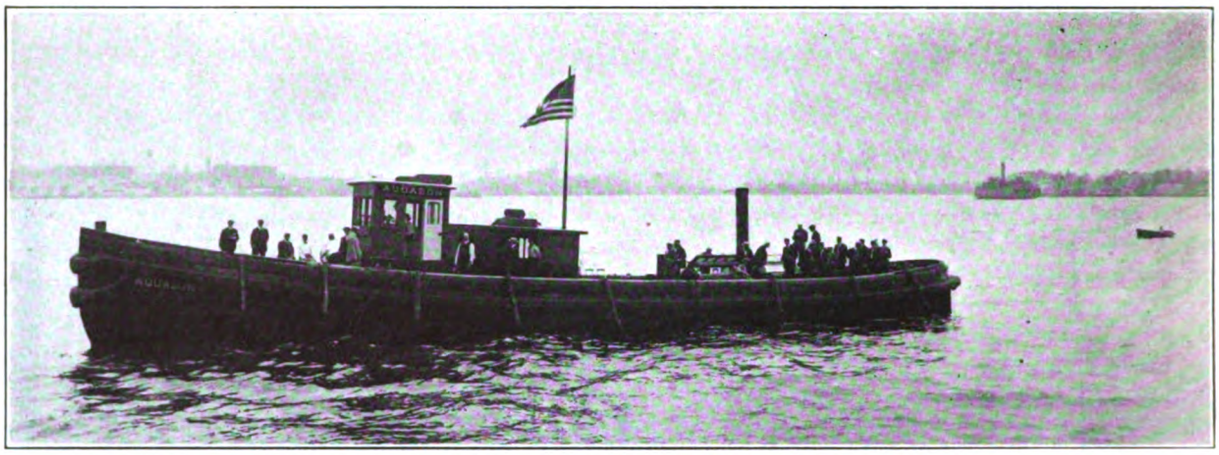
The vessel is single screw and steam is supplied by two Babcock and Wilcox boilers with a total heating surface of 7,000 square feet. The electric plant consists of three 100-kilowatt generating sets. The vessel's complement consists of 254 officers and men.

There are three complete decks fore and aft and also a platform deck which is as extensive as possible. Below the platform deck the hold is divided into compartments for trimming tanks, stores, provisions, etc. On the 'tween deck spaces above are located special storerooms, cold storage compartments and magazines, officers' quarters aft and crew space forward. There are three deck structures, the forward one housing the commanding officer, executive offices and navigating officer's stateroom. In the after deck house are the junior officers' quarters and the flotilla commander's stateroom and office. The midship house contains the engine-room hatchway, coppersmith and blacksmith's shops, foundry, storekeeper's and paymaster's offices.

The engine-room is divided into three compartments, the center one being the turbine room. In the starboard engine-room are three ice machines, the auxiliary condenser and the switchboards and generators overhead on a gallery. In the port engine-room are the main condenser, the main air and circulating pumps while on the gallery are four evaporators together with the necessary pumps. The capacity of the evaporator plant is 25,000 gallons per 24 hours and each of the three ice machines will make three tons of ice per day.

There are two separate Parsons turbine units, the high pressure on the starboard side and the low pressure on the port side of the ship. The transmission of power from the turbines to the propeller shaft is effected by means of Westinghouse mechanical reduction gears. The turbine speed is 1,400 revolutions while the propeller is driven at 110 revolutions. The gearing is of the double spiral type with the teeth of each cut in the opposite direction. Each pinion transmits 2,000 horse-power. The gear wheel center is made of cast iron, the rim of cast steel and the shaft of mild steel forging, while the pinions are made of rather high grade steel forgings and the pinion driving shafts of chrome nickel steel. The angle of the spiral is about 30 degrees and the width of face 16″ for each gear, making a width of driving face of 32 inches with 40 tooth contact points and a contact pressure of 562 pounds. The general advantages claimed for reduction gearing of this class are a 15% saving in machinery weights and a like amount in fuel consumption. The fuel is saved owing to the increased efficiency of the high speed turbine and the weight through the corresponding reduction in the size of turbine rotors.

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The "Aquadon," a New York Water-Boat Recently Equipped with a Bolinder Engine

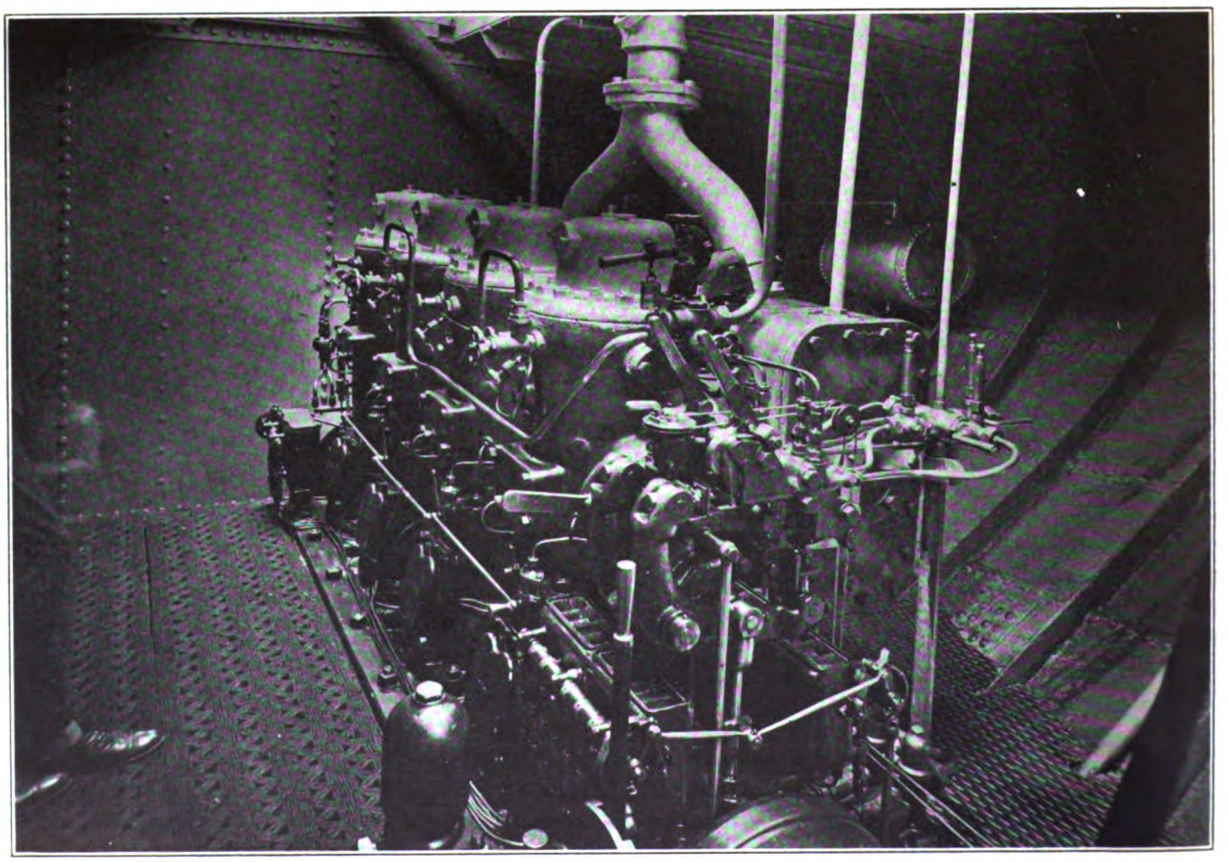
TRIALS OF THE "AQUADON."

The New York water boat "Aquadon" was recently converted to a motor-driven craft by the installation of a 100 horse-power Bolinder fuel oil engine and the trials of the new machinery have been carried out with equal satisfaction to the owners of the boat and the builders of the engine.

The Boston Provisions and Supply Company, the owners of the "Aquadon," are now operating the boat in New York harbor as a water boat. She is fitted with four water-tight bulkheads dividing the hull into five compartments. The forward compartment is used as a chain locker, numbers two and three holds are water tanks with a combined capacity of 45,000 gallons, the fourth compartment is utilized as an engine room and the after peak for fuel oil storage. The large water service pump for handling the fresh water tanks is situated on the starboard side of the engine-room and is driven direct from the main engine.

In changing the "Aquadon" over from a steam-driven to a motor-driven vessel, it was found possible to use the old stern tube by fitting bushings which reduced the inside diameter from nine to five inches. The foundation under the engine is very simple, consisting of two fore and aft plates riveted to the floors and stiffened at the outer sides.

The tanks carried in the engine-room for engine



The Engine-Room of the "Aquadon" Presents a Model in Neatness and Simplicity

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purposes are as follows: One 18″ in diameter by 30″ long with connection to the water injection pumps on the main engine and with a filling pipe from the fresh water service pump. One fuel service tank 16″ in diameter by 38″ long with connection to the fuel injection pumps on the main engine and which is filled by means of a clock pump, drawing from the main storage tank in the after peak. One starting tank 12″ in diameter by 60″ long used for storing the compressed air necessary for starting the engine. The pressure carried in this tank during the trial run was 120 pounds and the tank was only drawn upon once when first starting off the engine and the drop of pressure in the tank was only about three pounds. After starting the air flask was no longer used and the engine took care of itself during numerous maneuvers and reversings. This air flask is recharged from the compression in the after cylinder. There is another tank 12″ in diameter by 50″ long which is used as a whistle tank and also as a stand-by starting tank, being connected to the whistle pipe, the main starting tank and the recharging valve on the after cylinder of the main engine.

During the entire trial both the engine and boat gave splendid accounts of themselves and no trouble was experienced in maintaining a speed of 8 knots light and seven knots fully loaded. The guarantee of less than .63 pounds of fuel per horsepower hour was also easily met.

Performance of the "Selene"

THE "Selene" is a twin screw, two-masted, steel motor vessel fitted to carry bulk oil or cased cargo and was built in 1914 by the Caledon Shipbuilding and Iron Company of Dundee. The propelling machinery was constructed and installed at Amsterdam by the Nederlandsche Fabriek Van Werktuigen en Spoorweg Materieel. The "Selene" has a length between perpendiculars of 344′ 7″, beam 46′ ½″, gross tonnage 3738, displacement 7840 tons, draft at above displacement 22′ 3⅜″. The vessel has seven pairs of main cargo tanks with a gross capacity of 4700 tons of kerosene, also four pair of summer tanks with a capacity of 709 tons or a total of 5413 tons of kerosene. The bunker capacity is 692 tons, giving the vessel a cruising radius of 22,800 miles.

The propelling machinery on the "Selene" consists of two sets of six-cylinder, four-cycle, direct reversible Werkspoor Diesel engines; diameter of cylinders 20½″, stroke 35½″, indicated horsepower 2200 at 115 revolutions, on a consumption of 6.5 to 7 tons of heavy oil per twenty-four hours. The consumption per indicated horse-power in actual practice varies from .306 to .326 pounds per hour compared with about one pound for triple expansion steam machinery.

After satisfactory trials, at which a speed of 11.3 knots was obtained, the vessel was accepted from the builders in September, 1914, since when she has been regularly employed. On a voyage recently completed, the "Selene" left Cardiff on December 19, 1914, for Port Arthur, Texas; she then proceeded, via the Panama Canal, to North China. After discharging her cargo, for which purpose she only was in port four days, she made for Singapore, where she replenished her stock of fuel after 14,300 miles of running. This would not be an economical procedure in the ordinary course with a steamer, as it would result in shutting out a considerable amount of cargo to make way for coal, but in the case of the "Selene," although her captain had orders to replenish bunkers at Shanghai, he found the consumption on the run across the Pacific so economical that no bunkers were needed at Shanghai. In other words, the vessel was able to steam for fifty-four days with a full cargo of oil and twelve days in ballast at practically full power without replenishing her fuel supply. On her last voyage the "Selene" completely circled the earth, covering a distance of about 27,500 miles. The "Selene" is a sister ship of the "Ares," "Artemis" and "Hermes," all four vessels being engaged in the oil transport trade.

These ships represent a considerable advance upon the earlier motor vessels for the same owners. Several new departures and improvements had been incorporated in Werkspoor engines since the advent of the "Vulcanus" and "Juno," and it might have been reasonably expected that machinery defects would appear during the first six months' operation of the later vessels. Regardless of the apparent risk, however, these vessels were sent on extremely long voyages while fresh from the builder's hands, in fact, their opening service was regular routine work and no discrimination was made in their behalf. Another example of this was the "Artemis," this vessel being sent to Sydney, Australia, from the Tyne through the Panama Canal, immediately following eight months' service without docking. In this connection it must be remembered that proper facilities for the repair of Diesel machinery are not readily found in the Far East.

That the owners of these motor ships are well pleased with the performance of their Diesel-engined fleet is evidenced by the following statement given out by them:

"Our Diesel vessels, the machinery of which

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has all been constructed at the Werkspoor, Amsterdam, have been subjected in the first period of their running to the most severe tests, and having proved capable of standing these tests better than could reasonably have been expected, we feel entirely assured of the great success we have obtained with these vessels. They have now gone through their first and most trying period, and with small adjustments and improvements introduced, the machinery will become more reliable as time goes on.

"We also confidently expect that the running expenses of these vessels will compare satisfactorily with steamers of equal size, and we feel that in spite of disappointments with some Diesel-propelled vessels, there is a great future for the marine Diesel engine.

"In presenting the above in regard to our new vessels, we can not refrain from calling attention to the work which our little tanker 'Vulcanus' has performed. We particularly desire to emphasize the fact that this boat, built in 1910 and accepted from the builders in November of that year, was the first sea-going Diesel tanker in Western Europe, and it was from this pioneer ship that we gained our present knowledge and experience in the matter of the requirements of sea-going Diesel ships, and through this boat was largely achieved the present stage of reliability and development.

"It is significant that the 'Vulcanus' still shows herself to be a thoroughly useful and dependable motor ship, and we look upon her as an all-around success. A remarkable feature is, that apart from being regularly employed in our coasting trade, she has on more than one occasion been kept running for ten consecutive months without drydocking. The latest example of this is that she was drydocked in January, 1914, the delay for overhauling purposes being only ten days; she then continually ran till the 17th of November last. During this period the total time lost for engine repairs was 16 hours in port and 17½ hours at sea, a performance sufficiently striking to place the good qualities of this small boat beyond dispute."

ARIZONA AND PENNSYLVANIA.

The battleship "Arizona," which is a sister ship to the "Pennsylvania" building at the Newport News Shipbuilding and Dry Dock Company, was launched at the New York Navy Yard on June 19, practically sixteen months from the laying of the keel and at the time of launching was about 65% complete, her launching weight being 13,000 tons. The launching ways for the "Arizona" were 70 inches in width and about 600 feet in length. Their outer ends extended about 160 feet into the water and the depth on top of the ways at the extreme end was about eleven feet. The incline of the ways was 11/16" per foot and they were also slightly inclined transversely towards the center line of the ship.

As illustrating the advance in size and armament of American battleships during the past three years, the following comparison between the "Arizona" and "Pennsylvania" and the battleships of the "New York" type is of interest:

	"Arizona."	"New York."
Date launched	June 19, 1915	October 30, 1912
Length over all	608 feet	573 feet
Beam	97' 0½"	95' 2⅝"
Displacement	31,400 tons	27,000 tons
Draft	28' 6"	28' 6"
Main battery	12 14" B. L. Rifles	10 14" B. L. Rifles
Secondary battery	22 5" R. F. Guns	21 5" R. F. Guns
Auxiliary battery	4 6-pounder saluting	4 3-pounder saluting
Auxiliary battery	3 3" field pieces	2 3" field pieces
Aeroplane guns	4	None
Projectiles 1 discharge	18,044 pounds	15,102 pounds
Projectiles forward	8,700 pounds	6,000 pounds
Projectiles aft	8,700 pounds	5,850 pounds
Torpedo tubes	4 21" x 21'	4 21" x 21'
Engines	Parsons turbines	Reciprocating
Horsepower	34,000	28,100
Propellers	4	2
Speed	21 knots	21 knots
Coal capacity		2850 tons
Fuel oil capacity	2,322 tons	400 tons
Officers	53	63
Crew	927	1,009
Weight at launching	13,000 tons	9,000 tons

The launch of the "Idaho" makes room for the starting of the new battleship "California." The principal departure in this latter vessel and the one which will command widespread attention of marine engineers the world over is the fitting of electric drives by the General Electric Company.

In the "Arizona" and "Pennsylvania" a great deal of attention has been paid to securing economical results at cruising speeds and these vessels are fitted with cruising turbines which drive shafts through Westinghouse floating frame reduction gears of 2000 horse-power, the reduction being from 2500 revolution turbine speed to 192 revolution propeller speed.

Referring to the table given above it will be noticed that the "Arizona" possesses a 50% greater ahead and astern fire in the main battery than the earlier "New York"; this is due to the introduction of three-gun turrets. The crew of the larger vessel is somewhat smaller due to her being an oil burner and not requiring such a large quota of men for fireroom service and also to the fact that she is not fitted as a flag ship.

Lisbon, Portugal, is an important European seaport. During the fifteen years from August 1, 1899 to August 1, 1914, one American ship entered Lisbon harbor, and, while this may not appear to be a large number, it exceeds the entrances of American ships to some other important European ports.

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Seamen's Act Opinions

DESIRING to ascertain just how the men who are interested in shipping feel with regard to the Seamen's law, the "Nation's Business" requested a number of the heads of steamship companies to state their point of view. The following are some of the replies:

"Our laws and regulations must be changed to correspond to those of foreign nations with whom we come in direct competition. The laws of Great Britain are preferable as, under them, more than half of the steam tonnage of the world is successfully operated. Therefore, it is fair to assume that the British regulations cannot be far wrong. Our laws and regulations require twenty different changes to make the operation of ships correspond to that of the British. The time has certainly arrived for some constructive legislation. In the last session of Congress sixteen bills were introduced to restrict and restrain the operation of ships, and not a single bill to aid or assist us. We should have, I believe, a commission of shipping men, not politicians, to draft these laws, and to advise Congress, thereby preventing any future blunder like the Seamen's bill, the only result of which is to drive the last American ship from the ocean."—Captain Robert Dollar, President Dollar Steamship Company.

"The whole proposition respecting the Seamen's Act boils down to this: If the American people desire higher wages and special privileges for seamen on the high seas, someone will have to pay for them. If the law compels all ships entering our ports to pay higher wages, it means higher rates and the American farmer and manufacturer will have to stand the expense. If foreign ships escape the provisions of the law, as seems likely, and they should be enforced only against American ships, the law sounds the death knell of the American merchant marine."—Mr. Eugene W. Ong, General Counsel of the United Fruit Company.

"Certified public accountants have recorded their findings that the requirements of the Seamen's law will increase the cost of operation of the Pacific Mail service, in wages and feeding of crews alone, more than $600,000 per annum, which is considerably more than the company has earned in excess of its fixed charges and cost of operation in any recent year. It does not require any stretch of the imagination to realize that the service cannot be profitably operated after this statute becomes effective, November 4, 1915."—Mr. Lewis J. Spence, Director of Traffic of the Southern Pacific Company.

"The contention that the provisions of this statute permitting foreign seamen to desert their ships and violate their contracts with impunity while in American ports will be availed of by these crews to demand the higher wages prevailing at American ports, and that by this means the wages cost on the vessels of all nations will eventually be equalized, fails to take into account that such crews would be liable to imprisonment upon their return to their own country."—H. H. Raymond, President Clyde Steamship Company.

HOW THE UNITED STATES NEGLECTS ITS ISLAND POSSESSIONS.

The following figures compiled by the Foreign Trade Department of the San Francisco Chamber of Commerce from report of the Philippine Customs Department for the year ending December 31, 1914, will show how our present maritime laws leave the commerce of the Philippine Islands in the hands of foreigners. This is not only true of commerce between the Philippines and foreign countries, but between the Philippines and the United States.

The figures are the net registered tons entered and cleared:

ENTERED.

	American.	British.	Japanese.	Total.
Number vessels...	24	364	144	682
Net reg. tons.....	176,691	783,255	434,260	1,729,522
% of the total....	10.2	45.3	25.1	100.0

CLEARED.

	American.	British.	Japanese.	Total.
Number vessels...	23	333	66	550
Net reg. tons.....	172,867	784,344	258,828	1,504,317
% of the total....	11.5	52.4	17.2	100.0

The entire American tonnage sailed from and to the ports of Seattle and San Francisco, and not one American ship sailed from or to any Atlantic Coast or Gulf port. All shipments from and to these ports were carried in foreign ships.

When the Seamen's bill takes effect and the Pacific Mail, Great Northern and Dollar lines withdraw, there will not be one American ship operating between the United States and its island possession—the Philippine Islands.

The above condition is due entirely to adverse legislation. Of the total tonnage entered and cleared from the Philippines only 10.8 per cent. was in American ships, and they are about to be withdrawn on account of the Seamen's bill. A nice showing considering the fact the Philippines have a population of 8,643,000 and a total export and import commerce valued at $107,250,000.

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While the proponents of the Seamen's Act have been comforting themselves with the cry of "Wolf, Wolf," the inevitable has come to pass and they now find themselves in a position where they can no longer hold their hands before their eyes and cry—we see nothing. Directly in the face of conclusive evidence, men whose standing is good enough to secure places on the President's Cabinet have declared that the steamship owner was only bluffing and was making a sad job of it at that. The word of those who perverted the truth to suit their own selfish ends was set above the word of those whose entire lives fitted them to know whereof they were speaking and the result is chaos as far as the American merchant marine is concerned.

The paramount question in marine circles to-day is not "Will the Seamen's Act deeply injure American shipping?" but "How great an injury must be borne before the country fully realizes the necessity for remedial action?" That the American ship will be called upon to stand alone in bearing the increased cost of operation entailed by the provisions of the Act can hardly be questioned, and yet men high in the councils of our Government are publicly proclaiming that the Act will benefit the American ship by raising the operating costs of its foreign competitor.

Under the guise of increasing safety at sea a great mass of matter has been brought into the Seamen's Act in order that the harpoon it contains might be concealed. Congressmen and Senators were led to believe that by doing away with all discipline on board a ship that further safety would be secured. Did it ever occur to one of these same Congressmen or Senators that an able bodied seaman should be able to swim? Strange that nobody thought of that. The Seamen's Union has cut down the tree in order to trim it, and now the Government is trying to wriggle out of its predicament as best it may.

TERMINAL COSTS.

One factor in the rise of England to commercial supremacy on the sea and the still more spectacular growth of Germany as a sea power was undoubtedly the manner in which the people of these countries solved the problem of lowering the cost of handling freight between land and water transportation units. Most of the great seaports in Great Britain and Northern Europe were confronted with the difficulty of great variations in tide level. This condition necessitated tremendous expenditures for wet docks and other harbor works of a nature practically unknown in the United States. Naturally the expensive nature of these works and the large interest charges they entailed tended to raise cargo handling costs and in their efforts to counteract heavy charges on original investment various port authorities turned naturally to the mechanical handling of cargoes in transit from the ship to the wharf or vice versa. In the United States the reverse of European conditions has been the rule. Most of our harbors do not have any very great tidal difficulty and until recent years the rule was a cheaply constructed timber wharf with all the cargo handling gear carried on the ship herself. The exception to this rule, of course, was the Great Lakes where the handling of bulk cargoes was reduced to an exact science and performances were and are still being recorded that remain unapproached.

The handling of general freight at our seaports leaves very much to be desired and while port authorities have come to recognize the value of mechanical handling appliances there is still a great gulf separating the efficiency of the under-equipped American wharf and the European quay with its batteries of cranes and transfers. As terminal costs represent one-half of the total water transportation cost, they certainly can not be ignored if the United States wishes to still further widen the scope of her foreign trade by lowering the delivery charges on the manufactured goods and raw products which we wish to sell to the people of other nations.

The collier "Franklin," built by the New York Shipbuilding Company to the order of the Coastwise Transportation Company, was launched August 21st. The "Franklin" is the first of six vessels to be built by the Camden concern for the Coastwise people. The second boat is to be named "Plymouth" and will be launched about the middle of the month.

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A Slap in the Face for San Francisco

"A MAN convinced against his will is of the same opinion still" is an adage that accurately describes the state of mind of those who for the past six months have been referring to the announcement that the Pacific Mail Steamship Company would withdraw its transpacific ships as a "bluff." Even now, with the sale of these ships confirmed and consummated, Government officials and others who do not care to be better informed cling tenaciously to the idea that somehow or other the "Mongolia" and "Manchuria," the "Korea" and "Siberia" will continue to sail to Hongkong.

The Pacific Mail's having been in business between San Francisco and the Orient for so many years, its enterprise and dogged determination to continue despite long periods of adverse trade balances, its patriotic loyalty to the flag of a Government that rewarded that loyalty by deserting the firm at every turn and the part it played in developing a great Oriental trade for San Francisco, combined to make an organization that has been long looked upon as a western institution rather than a line of passenger and freight steamers.

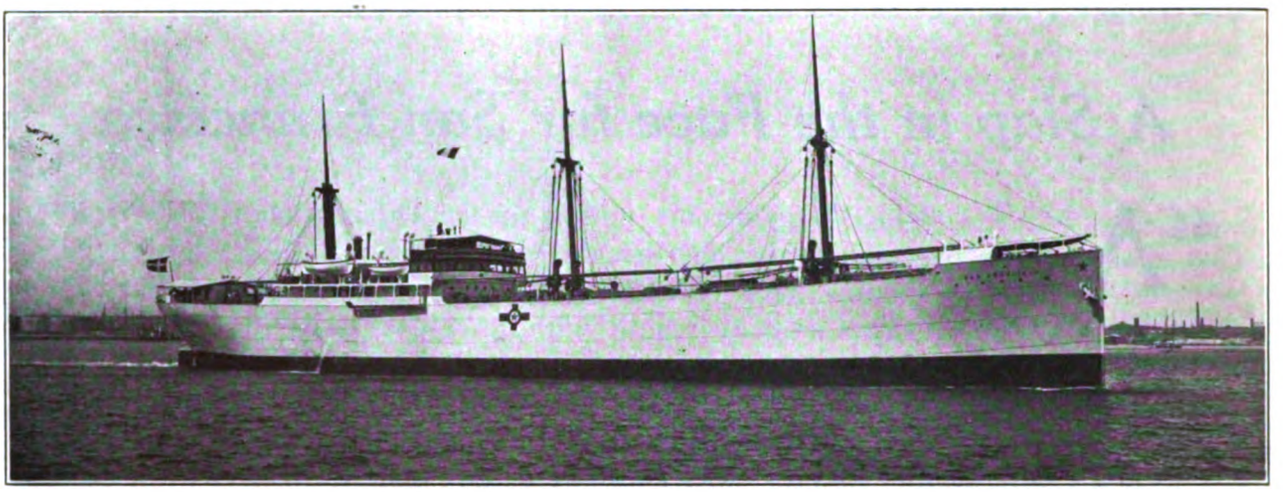
But San Francisco is not the only community that will miss the Pacific Mail. "Far East," of July 24, contains the following brief notice in its editorial columns:

"The Philippine Islands, which appear to be wedded to adversity, would be seriously affected by the promulgation of the Seamen's law, and the feeling aroused in the archipelago is well described by an old resident of Manila in the 'New York Times,' Mr. T. L. Davis, who is thus quoted:

" 'Manila shippers are greatly disturbed at the prospect of losing the Pacific Mail Company's service. This latter company went into the Philippine trade as a pioneer, and has proved of great benefit in developing trade. It is not making it too strong to say that this company "put the Philippines on the map commercially," as it was the first concern to take big chances and fly the United States flag on its vessels.' "

As far as San Francisco is concerned, the best that she can say is that the Government of these United States has played her a mighty scurvy trick. The Pacific Mail was one of the few things which belonged to the western metropolis by birthright, the start of the city and the Mail Company were almost synonymous and the early steamer line did more than its full share towards making San Francisco known to the far corners of the earth. The Government has sold one of our birthrights, but the price received is worth far less than a mess of pottage. A goodly proportion of our transpacific trade has been exchanged for a peck of troubles. The fact that the Pacific Mail Steamship Company was instituted at the urgent request of the United States Government does not throw any additional luster upon the present course of official Washington. If we may be permitted to quote waterfront opinion, the Pacific Mail has been handed a damn rotten deal.

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Motor Ship "San Francisco, a Recent Johnson Line Visitor that Created a great deal of Interest among Engineers and Vessel Owners

Motorship "San Francisco"

One of the latest Burmeister and Wain built motorships is the "San Francisco" and the accompanying photograph of this vessel will be of especial interest as she will be a frequent visitor to the port whose name she bears. The trial trip of the "San Francisco" was held on Copenhagen Sound on June 12 and was in every way successful, the vessel starting for Stockholm to take on cargo on the evening of the trial. The "San Francisco" is the sixth and final ship of the original order of the Rederiaktiebolaget Nordstjernan, the first vessel, the "Suecia" being built in 1912. The same firm has placed an order for four more motorships, the construction of which is now under way.

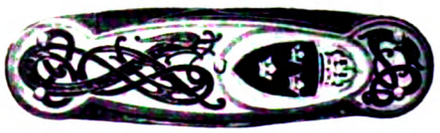
The San Francisco is 362′ 0″ between perpendiculars, 51′ 3″ beam, 34′ 0″ depth from awning deck and of 6550 tons deadweight capacity. She is a twin-screw vessel with 2 four-stroke single acting main engines, each having six cyclinders and capable of developing at normal load 2000 I.H.P., giving the ship a speed of ten knots. Two large Diesels of 200 B.H.P. each operate all the auxiliary machinery including winches, steering gear, windlass, electric lights, etc. The capacity of these engines enables one to be held at all times as a spare.

During the trial trip a speed of 10.62 knots was maintained with the main engines indicating 1885 horsepower and the wheels turning at 151 revolutions. The consumption of fuel oil averaged 265.35 kg. per hour with 1863 horsepower on the main engine or .143 kg. of oil per horsepower hour including the auxiliary machinery. The oil used during the trial was solar oil.

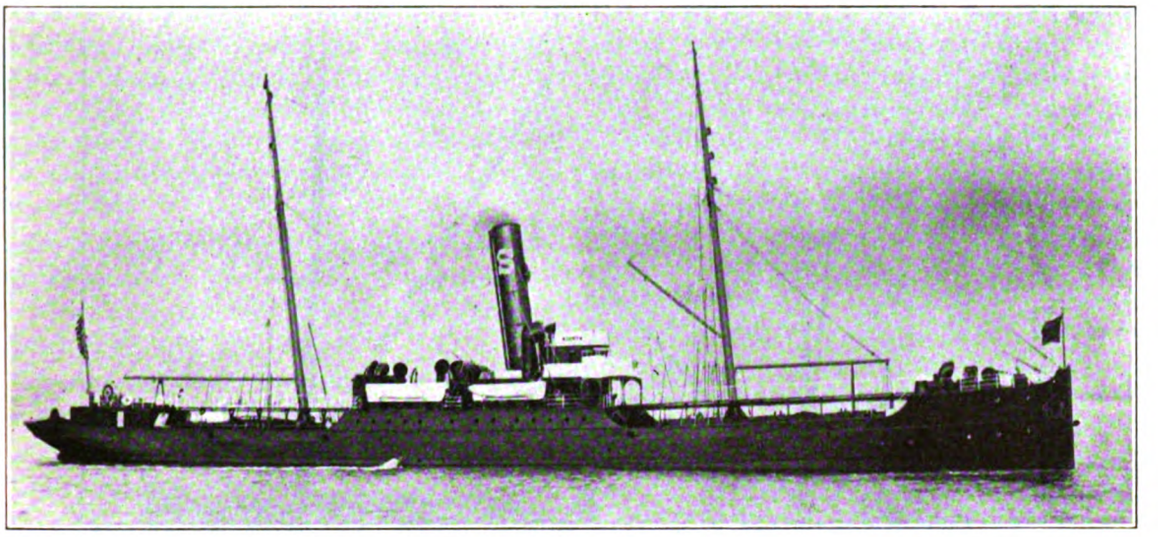
The premier visit of the "San Francisco" to the port for which she was named was made the motif for a pleasant gathering of steamship and transportation men who luncheoned aboard the vessel and received several handsome souvenirs of the occasion, among which were the useful and handsome pocket knives pictured herewith. The hosts at this gathering were the local heads of the firm of W. R. Grace & Company, this concern acting as western agents for the Johnson Line. Those who attended inspected the vessel thoroughly, being highly interested in the trim, clean appearance of the engine-room, the compactness of the machinery arrangement, etc. Among the objects which attracted universal interest was a Tuxham engine connected to the auxiliary electric lighting plant and the Schmidt self-acting davits. These davits are arranged to just about swing out of their own accord when released, their action in this respect being accelerated if there is any weight in the boat. The falls are carried on a drum, thus doing away with all possibility of the falls fouling.

The Fore River Log is the name of an interesting publication that is being issued by the Fore River Shipbuilding Corporation in the interest of harmony and helpfulness. The initial number of the "Log" is given over to a description of the various social and athletic activities of the employees. The get-up is attractive and the subject matter well arranged, nicely illustrated and instructive.





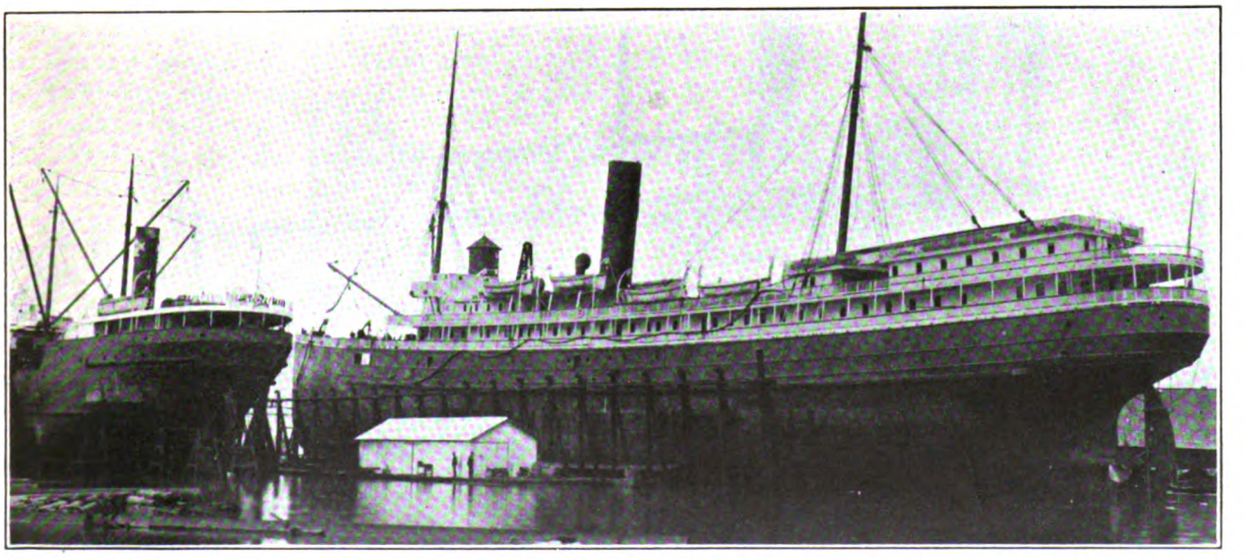
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This Standard Oil Tanker was Practically Rebuilt at the Yards of the United Engineering Works

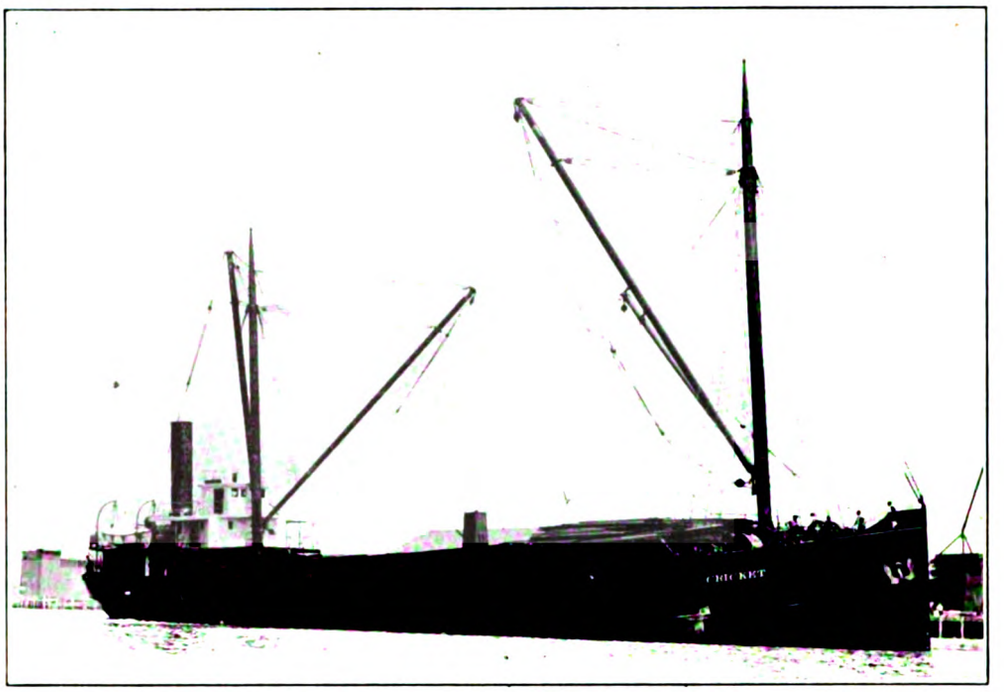


The Water Front of the United Engineering Works, Showing Two Coasting Craft Under Construction



The Pacific Coast Steamship Company's Steamer "Queen" on the Marine Ways at the United Engineering Works

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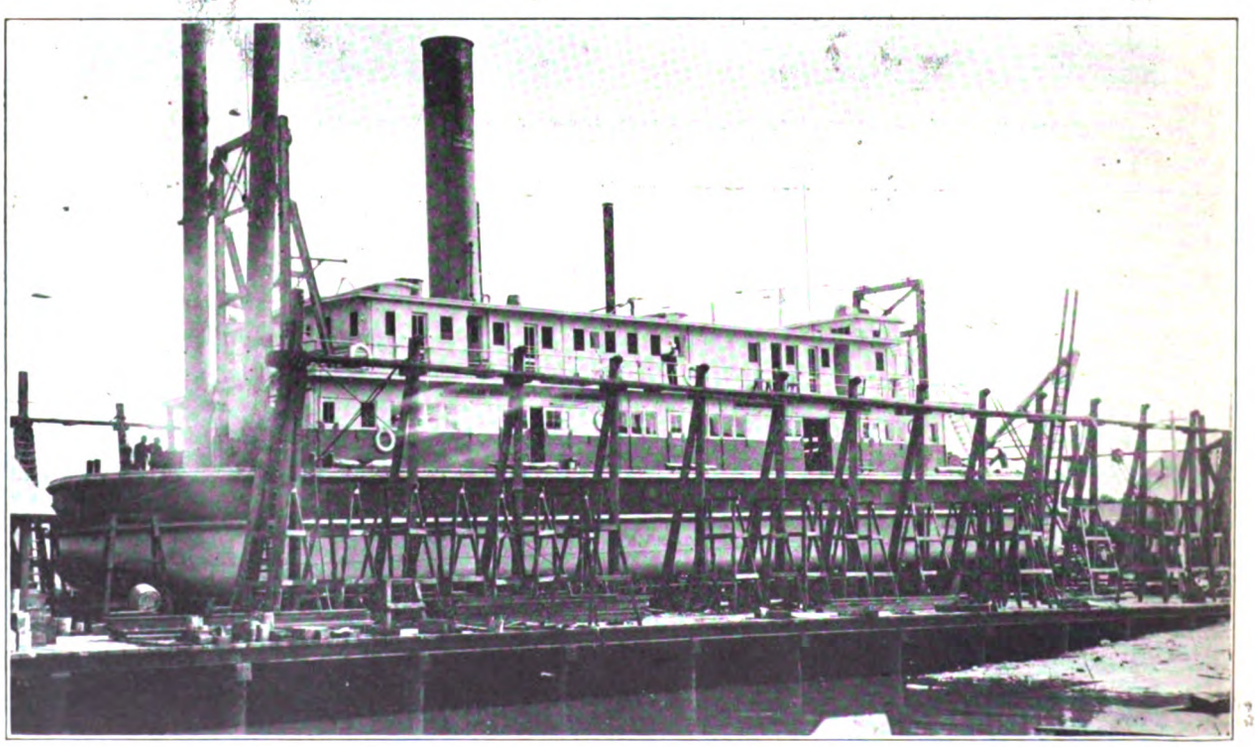


The "Cricket," a Product of the United Engineering Works

The United Engineering Works

THE United Engineering Works has taken a prominent part in the marine engineering and shipbuilding activities of San Francisco Bay during the past fifteen years. Holding an enviable reputation for both hull and machinery work and having well-equipped shops fully capable of taking care of the machinery requirements of vessels up to the limits set by the building-slip equipment, this concern has built many vessels for the coasting fleet, dredgers and a very large number of compound and triple expansion steam units of varying sizes.

The San Francisco offices and shops of the United Enginering Works are located on Spear street, while the main shops and shipyard are on the estuary of Oakland Creek. At the shipyard two marine railways are in operation, one having a length of 235 feet, a beam of 65 feet, and a capacity of 2000 tons, while the other is 370 feet in length, 70 feet in beam.



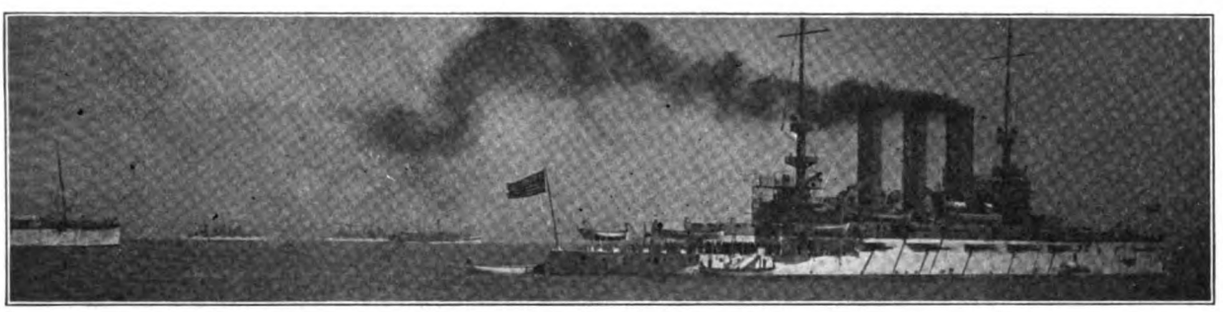
One of the Marine Ways in Operation

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and is capable of handling a 4000-ton ship. There are two building slips at the present time, but additional space is always available. The smaller slip is 250 feet in length, the larger 350, but this latter can be extended to 450 should the need arise. At the docks of the concern there is about 2000 feet of wharfage available.

The main shops of the United Engineering Works are three in number. The machine shop covers an area of 90 by 225 feet and is thoroughly equipped with modern tools, traveling cranes, etc. A foundry 82 by 43 feet in size and having a capacity of 40 tons of metal per day and a large pattern shop 40 by 150 feet completes the main shop equipment.

The United Engineering Works has taken a prominet part in the upbuilding of our coastwise lumber fleets and soon attained an enviable reputation as a producer of high class engines for steam-schooners. The extent of their business in this one field alone is illustrated by the following partial list of engine-room installations on coast lumber-carrying craft: In 1900 engines were put in the "Iaqua" and the "Nome City"; in 1901 on the "Acme" and "Gualala"; in 1904 on the "James S. Higgins"; in 1905 on the "Coaster," "Daisy Mitchell," "Johan Poulsen" and "Wasp"; in 1906 on the "Casco," "Hoquiam," "Hornet" and "Tiverton"; in 1907 on the "Bowdoin," "Daisy Freeman," "F. S. Loop," "Tahoe" and "Wellesley"; in 1908 on the "Daisy" and "J. J. Loggie"; in 1910 on the "Klamath," "Nehalem" and "Fort Bragg"; in 1911 on the "Daisy Gadsby"; in 1912 on the "Avalon," "Davenport" and "Necanium," and in 1913 on the "Cricket," "Daisy Putnam," "Mary Olson," "O. M. Clark," "Rosalie Mahony," "San Ramon," "Siskiyou" and "Solano." In all the United Engineering Works have turned out 132 marine engines with a total horse-power of 34,850.



European Marine Notes

[From our own Correspondent.]

London, August 15th, 1915.

Panama Canal and British Commerce.

The war—combined with occasional landslips—continues to stunt the growth of traffic through the Panama Canal. According to the latest official returns received here, the traffic during April was smaller than in March. One hundred and nineteen ocean-going vessels, carrying 522,841 tons of cargo, passed through the Canal, while in the preceding month the respective totals were 136 and 635,057 tons; while since the opening of the waterway last August the total number of vessels that passed eastward and westward was 801 carrying 3,768,860 tons. The use of the Canal, however, is beginning to result in some important developments in British traffic. An all-water route has now been opened from every point on the North Pacific coast to the United Kingdom by way of the Canal. Another development promises to be of considerable importance to the commercial interests of the British West Indies, this concerning the shipment of the first cargo of sugar from Port of Spain, Trinidad, to Vancouver by way of the Canal. The total sugar crop, which finishes about now, is estimated at something over the average of the past few years, and with the favorable prices due to the outbreak of war the position of the industry is stronger than it has been for a long time.

Easier Freight Rates.

Freight rates have again become easier, and, as compared with $15.30 a ton recently obtained for the voyage from up-river ports of the Plate to this country with maize, a rate of $13.72 is now current. Merchants here have been lately trying to arrange fixtures at $13.12, but, in view of a certain inquiry for tonnage, owners were not inclined to accept the further reduction. As regards the tendency of rates in the immediate future, owners find themselves quite unable to express any opinion beyond the fact that it entirely depends on the extent of the demand, which is a matter of which the merchants are the best judges; but they have no doubt at all that when the autumn demand sets in rates will stiffen again definitely for the winter. Now that chartering for Indian account is quiet there is at the moment comparatively little demand for tonnage, apart from the requirements of the Plate for the maize shipments and of North

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America to replace the coal exports of this country. But when in August North America begins to ship her new grain crop, and in September her cotton, there is certain to be the keenest demand for tonnage. The owners who have lately been willing to pay enormous prices for any second-hand vessels they could secure have certainly done so with their eyes on the statistical position.

Still Dearer Ships.

Notwithstanding the all-round fall in ocean freights, largely, I hear, in consequence of the accumulation by owners of tonnage at various ports in the hope that rates would advance still further, there is no reduction in the cost of second-hand merchant ships. Prices are rising, and lately some remarkable transactions have taken place. As, of course, foreign vessels are not subject to requisition by the Admiralty their value is higher than that of British steamers, a Greek boat changing hands the other day at $375,000, or about $50 a ton as compared with $15 before the outbreak of war. And in this connection it may be added that she was built thirteen years ago. Another ship, which was sold in November last for $100,000, has just fetched $225,000, and there is good reason to believe that the buyer could get a profit on this figure now. The "Sumatra" of 4,600 tons gross, which was for many years in the P. and O. Service, was sold 18 months ago for $75,000, and 10 days ago was withdrawn from auction at $135,000. She has since been sold privately for a higher price. The vessel was built in 1895. A steamer of 4,700 tons deadweight, which was also built 20 years ago, has just been sold for a sum about 10 per cent. less than her cost price. In ordinary times about 20 years would be considered the normal life of a steamer. Brokers report that there are now more buyers than sellers in the market, and they see no prospect of any fall in shipping values. New vessels are impossible to obtain, and present conditions indicate that there will be a dearth of them for some years, while in the meantime the wastage is abnormal. Preference is naturally being given to naval work, with the result that shipbuilders cannot be induced to quote a price for or guarantee the delivery of merchant vessels.

Submarines and Shipping.

As far as can be ascertained, neither ship-owners nor underwriters are seriously alarmed about the depredations of the German submarines, although the losses admittedly have been much heavier than was anticipated when the submarine "blockade" was begun. In view of the increasing scarcity of tonnage the sinking of merchant ships is naturally deplored. Yet, so far as importation of foodstuffs is concerned, there was an increase of over 100,000 tons during the first five months of the submarines' activities, as compared with the corresponding period of last year. The State war insurance office still maintains the minimum rate of a guinea per cent., but the premiums quoted by Lloyd's and the marine companies vary according to route. North Atlantic business to and from Liverpool can be done at a little over the Government figure, while to or from London or Havre the rate is 25 shillings per cent. New precautions against submarines—steps which cannot be described here—have been taken to deal more efficiently with the menace. As regards the situation generally, the members of Lloyd's do not share the Kaiser's belief that the war will be over in October, for they are now asking 25 guineas per cent. "to pay a total loss if peace is not declared by December 31, 1916."

Shipping in the Far East.

According to the chairman's speech at the annual meeting in London of the Indo-China Steam Company, a number of orders from China have been coming through lately for shares in this company. As to what are the reasons which prompt this buying from China, no one on this side seems to have any exact information. But there is often a strain in the Chinese character to which speculation appeals, and there are certainly factors in the present position of the company and points in the report and the chairman's recent speech which induces the belief that the results for the present year should be very considerably better than those for 1914. To begin with, it was only towards the end of last year that Far Eastern trade began to improve, and not only has this improvement been well maintained this year, but on the subject of higher rates in the Calcutta route an agreement has lately been reached with the Nippon Yusen Kaisha, whose strenuous competition was for many years a thorn in the flesh of the Indo-China Steam. The German flag now appears on no craft in the Eastern seas and British, Japanese, and neutral ships are able to carry on their business absolutely undisturbed by mines or submarines. Perhaps, therefore, it is not surprising that the merchants of South China, seeing the ships leave and arrive fully laden with merchandise paying good freights should think that some of the profits they have earned from high prices for produce might be, with advantage, invested in the fleet, for a time at any rate.

Decrease in Shipbuilding Construction.

Lloyd's Register Shipbuilding Returns for the quarter ended June 30th, just issued, states that in consequence of the war, it is not possible at present to publish the usual information regarding the shipbuilding industry throughout the world. The present returns are, consequently, confined to merchant vessels in course of construction in the

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United Kingdom. Excluding warships there were 442 vessels of 1,506,925 tons gross under construction at the close of the quarter. The total included 434 steamers of 1,505,025 tonnage. The total tonnage now under construction in the United Kingdom is nearly 81,000 tons below that which was in hand at the end of the previous quarter and about 215,000 tons less than the tonnage building twelve months ago. Of the steamers under construction, 27 were between 8,000 and 10,000 tons gross, nine between 15,000 and 20,000 tons, one between 20,000 and 25,000 tons, one between 25,000 and 30,000 tons, one between 30,000 and 40,000 tons, and one above 40,000 tons.

The work in hand in the principal districts showed that Glasgow took the lead with 80 steamers and two sailing vessels building, aggregating 353,923 tons. Newcastle was next with 62 vessels, of 270,854 tonnage, and Hull occupied third place with 50 steamers, totaling 26,032 tons. During the quarter ended June 30th last 84 steamers of 172,325 gross tonnage, were commenced in the United Kingdom, while of vessels launched there were 74 steamers, of 147,964 tons, and one sailing vessel of 250 tons.

The War and Austrian Shipping.

The report just issued by the United Austrian Shipping Company, Austro-Americano, Trieste, discloses a net loss of $1,095,000, as against a net profit of $530,000 last year. The capital is $5,000,000. No dividend is being paid, as against 8 per cent. All the ships, it appears, were brought safely into home or neutral harbors on the outbreak of the war, but since then, of course, the sailings of the company have been completely suspended. Large expenses are still being incurred in connection with the maintenance of the organization of the undertaking both at home and abroad, but the company hopes that the Government will make a liberal grant in order that these may be met without unduly straining resources. Of two large boats, each of 10,000 tons, which were being built when hostilities commenced, one was launched last April, but arrangements have been made for postponing delivery of the other, and a large passenger ship of 15,000 tons previously arranged for will also be kept back. Including ships under construction, the company controls 33 steamships and 41 other boats, representing a total gross tonnage of 208,894. Arrangements for increasing the capital by $2,500,000 have been canceled, and the firm's prospects have been rendered still darker by the entry of Italy into the war.

Future of Shipping Industry.

Sir Edward Hain, the retiring Chairman of the London General Ship-owners' Society, has favored your correspondent with some of his very expert views with regard to the future of the shipping industry. During the war neutral shipping, he said, had reaped a very rich harvest by engaging on voyages prohibited to British vessels. It had been stated that the profits of the Greek mercantile marine for the current year would amount to $15,000,000, and other neutrals would probably show a proportionate result. Thus Britain's competitors were in a much stronger financial position to develop their mercantile fleets and to compete with us than ever before. America for many years had been feeling her way to the establishment of a mercantile marine, and America's natural ambitions in that direction had been strengthened by her possession of the Panama Canal. Americans were fully alive to the experience gained in the present war as to the value of sea power.

Sir Edward forecasted an extension of shipbuilding facilities in the United States and an increase in their competition with the yards of England. Owing to war conditions, prices for new ships in this country had reached to the higher standard of values prevailing in other countries. Those countries were now endeavoring to do for themselves what, by this country's methods of ship construction and engineering skill, Great Britain had hitherto very largely done for the shipbuilding world. It was thus of the highest importance that the British mercantile marine should issue from the war with financial resources unimpaired, so that the British position in shipbuilding, marine engineering and ship-owning should be maintained, and that the host of labor dependent upon the success of shipping in all its branches should be fully employed.

Sir Edward declared that he was satisfied that British shareholders would adapt themselves to the new conditions, but it was only by steady and strenuous endeavor that they would make good.

Among the magazines that arrived during the past month none held more of interest than the Empire number of Syren and Shipping Illustrated. That such a paper can be issued in the midst of a great war is indeed a revelation of the wonderful resources of Great Britain. The number is replete with splendid illustrations and the place of honor among the contents is given to an article on the Panama Canal. Another feature of interest to Pacific Coast readers is an "Outpost of the Empire" describing the Yarrows plant at Vancouver.

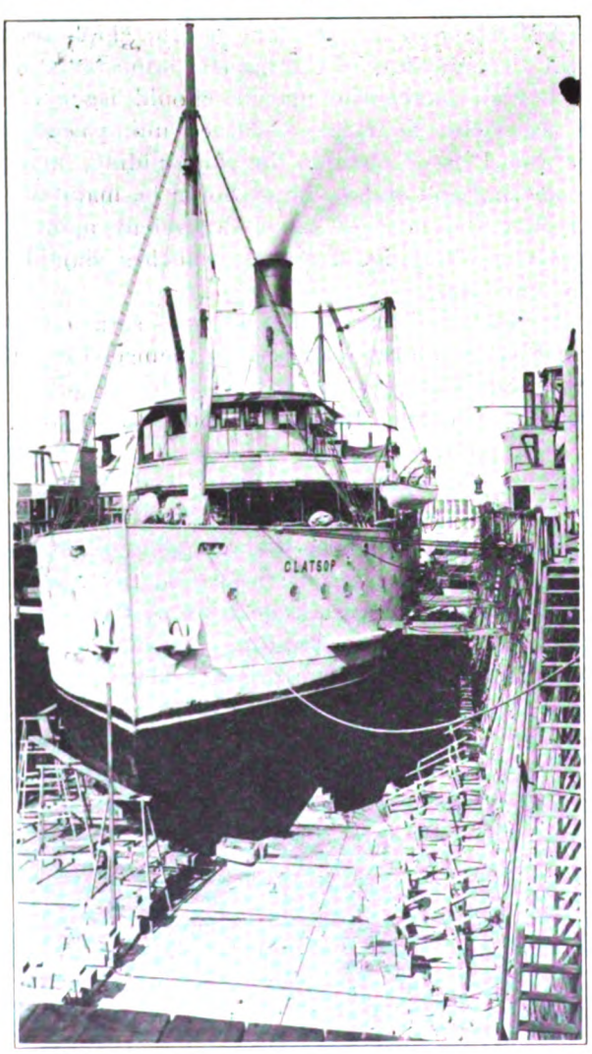
The recent completion and opening of Lock 17 on the Warrior River has made Birmingham, Alabama, a seaport. Shipments are now being made direct from New York to Birmingham via Mobile by water, Mallory line steamers delivering the freight to river steamers and barges.

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Shipping Notes

The Willamette Iron and Steel Works have been kept fairly busy with a wide range of marine work during the past month or two. A cut is shown herewith of the installation of a new boiler in the Port of Portland tug "Wallula." This is a Scotch marine boiler, 13′ 0″ in diameter by 11′ 0″ long, is fitted with the Dahl oil burning system and is the largest Scotch boiler ever made in Portland. The other picture shows the United States dredger "Clatsop" in the Oregon dry dock during an extensive overhaul.



The U. S. A. Dredger "Clatsop" in the Oregon Dry Dock

The Straits Settlements possess great trading ports where the ships of many nations gather although during 1914 not a single American ship traded in these waters. The following table gives the tonnage of vessels entering and clearing from Singapore, Penang and other minor ports in the Straits Settlements:

	Tons.
United States, 1913	4894
United States, 1914	none
Chinese	42,486
Swedish	79,898
Sarawak	101,218
Siamese	104,146
Spanish	131,018
Danish	285,618
Russian	312,896
Austrian	381,564
Norwegian	578,326
French	694,508
German	2,240,610
Dutch	2,534,814
Japanese	3,086,717
British	14,210,180

The transport "Merritt" and U. S. mine planter "Gen. Knox," now stationed in the Philippines, are being equipped with Eckliff Automatic Boiler Circulators. These circulators were ordered through office of U. S. War Department, Depot Quartermaster, San Francisco. Eckliffs have also been specified for U. S. Coast and Geodetic S. S. "Surveyor" and for U. S. Army Engineers' Dredge and Rock Drill "Gen. Gillespie."

With the arrival of a steamer of the Atlantic, Gulf and West Indies Line on August 19 at Houston, Texas, that city took its place as a seaport. The ship channel leading to Galveston is 50 miles long, 27 feet deep at low tide and 200 feet wide at the bottom. The City of Houston has on hand a $3,000,000 fund for the improvement of the channel terminal, wharfage will be free and the cost of maintaining the twenty-seven foot channel will be borne equally by Houston and the Federal Government.

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Placing a New Boiler on Board the Portland Tug "Wallula" at the Willamette Iron Works

On June 16th the Maryland Steel Company launched the steamer "Edith," building for the Bull Steamship Company.

J. J. Kane is to establish a shipyard, floating drydock and marine ways at Galveston during the coming autumn.

The death of John Brown Herreshoff removes America's most distinguished and ablest yacht designer. Mr. Herreshoff's skill and wonderful success becomes all the more startling and impressive when it is realized that the man who did more than any other to retain the America's cup on this side of the Atlantic became blind at the age of fifteen.

The latest Burmeister and Wain motor-ship, the "Australien," is now about ready to start on her first voyage. The "Australien" is of 9500 tons dead weight capacity, and is driven by two six-cylinder, four-cycle Diesel engines, each developing 1550 horsepower.

The torpedo-boat destroyer "Conyngham" was launched on July 8 at the Cramp Yard, Philadelphia. This vessel is one of a class of six destroyers with a length of 310 feet and a displacement of 1090 tons.

WHERE IS THE DEEP-LOAD LINE?

The latest revised rules and regulations in the mandates of the U. S. Steamboat Inspection Service, in Section 1, Rule XI, lakes, bays and sounds (proviso of fifth paragraph of section amended), sets forth as follows:

"On and after (January) July 1, 1915, all steamers carrying passengers subject to the inspection of this service which are provided with a plant for electric lighting purposes, the dynamos of which plant are located below the deep-load line, shall have on board an auxiliary plant located above the deep-load line, capable of thoroughly lighting the vessel in case of an emergency."

In Great Britain the language of this provision would probably be taken to mean the deep-load line of a ship as indicated by her Plimsol marks, but the term "deep-load line" has no definite or exact meaning on an American ship. Without any desire to quibble over the exact meaning of a term, the fact that the language is more or less meaningless might give rise to a serious problem in some cases. If we accept as a deep-load line the mean draft of a vessel loaded to her nominal dead weight carrying capacity, we are confronted with the fact that such a ruling as the one above might work a hardship on a combined freight and passenger vessel.

On the Pacific Coast where the regular coastwise passenger steamer handles general freight, it is very rare to have a vessel loaded to her deadweight carrying capacity. An electric light plant located on the main deck of a coasting vessel in many cases would be below the water line were the vessel to be loaded to her capacity deadweight, but on the other hand the plant would be above the actual waterline at all times during the service of the ship. In cases where the extra electric light plant is necessary in order to comply with the law and where at the same time care must be taken concerning the addition of top weights, a difference of two or three inches in the height of a deck means another eight-foot rise for the new electric light plant or heavy storage batteries, and this in some few cases presents difficulties.

"I am neither a prophet nor the son of a prophet—I am not even Saul, the son of Kish—but I want to make this prediction: That the Pacific Mail Steamship Company will not go out from under the American flag and will not go out of business."—Secretary of Labor Wilson. We quite agree with Mr. Wilson, as a prophet he is not a howling success. In his speech before the Commonwealth Club at San Francisco he proved clearly that his knowledge of the Seamen's Act is rather hazy and if he makes a false prediction or two in regard to its effects there is little cause for surprise.

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The Way We Are Headed

THIS glorious flag that used to fly at the peak of ships carrying more than four-fifths of all our foreign trade is now being pulled down, but not by an enemy!

For more than half a century prior to the Civil War all foreign goods brought across seas in American ships were allowed a reduction of 5 per cent. in tariff duties. This was a substitute for ship subsidies. It worked well. It put the American flag in every ocean. It gave us a great merchant marine and largely increased our foreign trade. It was good democratic doctrine. It had age and experience, wisdom and success to commend it.

The same provision was written into the Democratic tariff bill in the last Congress by Mr. Underwood. It was Section J, sub-section 7, and reads as follows:

"That a discount of 5 per centum on all duties imposed by this Act shall be allowed on such goods, wares and merchandise as shall be imported in vessels admitted to registration under the laws of the United States."

By executive order, President Wilson directed that this Act of Congress should be ignored by all Federal officers. He held that it was objectionable under our treaties. The United States Court of Claims decided that the President had no right to do this. But the President overruled the Court of Claims and decided that the Federal officers should continue to ignore the law until the Supreme Court decided otherwise. A suit is now pending in this higher court to determine whether the executive is vested with the power to set aside this Act of Congress. This means two more years of nullification of the work of Congress.

Following the refusal to execute a law of Congress in favor of American ships, the executive last March signed another Act called the Seamen's Bill, imposing new and harder conditions upon all American shipowners; requiring seamen to get certificates of capability, placing new restrictions upon clearance papers, and exacting that a majority of every crew shall speak the language of the ship-master.

Under this latter provision our foreign commerce, already languishing on the Atlantic Ocean, is summarily destroyed on the Pacific Ocean.

The Pacific Mail Steamship Company has for a generation operated the largest fleet on the Pacific. Friday it announced the sale of five of its steamships, and that the last of its steamers for the Orient will sail August 25. It will then go out of business. The Great Northern steamships are already out of business. The Robert Dollar line on the Pacific gave up before the Pacific Mail.

After November 4 next the United States mails and the United States soldiers going to or from Hawaii and the Philippines, our own dominions, will be transported across the Pacific by Japanese steamships—unless one of our few army transports is ordered to take them!

The author of the Seamen's Bill put into it humane ideas about the treatment of sailors, and also wise safety regulations for passengers, and he intended to enforce these new rules on foreign as well as on domestic ships.

But to put these laws in full effect it was necessary for the President to denounce (give notice of termination of) twenty treaties with other nations. This he has done. But a year's notice is required. Until then the new regulations will not apply to any foreign ship, and in the meantime will kill off all or nearly all American ships.

In this matter we see the consequences of having as President a man who knows little about business and who does not take the advice or counsel of any man who knows much about it.

Indeed, experience in large affairs, or prior success, seems to constitute ineligibility to office.

It gives us poor consolation to remember that under the Democratic party the American flag attained a proud eminence on every ocean and in every foreign port and won the War of 1812 on the sea even before General Jackson's victory of New Orleans on the land; and very little hope when the Secretary of the Treasury says, as he did a few days ago:

"The Democratic party is pledged to provide an adequate merchant marine for the United States, and in my opinion no time should be lost in taking action."

Is it not an extraordinary fact that in the case of the Seamen's Bill, which imposed new hardships upon the dying American merchant marine, the President decided to sustain the law and to nullify all foreign treaties inconsistent with it, while in the case of the Underwood preferential duty, designed solely to put the dying American merchant marine on its feet again, the President decided to sustain the foreign treaties and to nullify the law?

On August 16, the Hearst papers contained the above editorial anent the effects of the Seamen's Act.

The Submarine Boat Corporation was recently incorporated in New York for the purpose of taking over the Electric Boat Company and its allied interests. The Electric Boat Company had an authorized capital of $5,000,000 common and $5,000,000 preferred stock, of which all the common and a little over one-half of the preferred was outstanding.

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Mr. Alexander's Obsession

THE Maritime Exchange Bulletin for July, 1915, contains the following communication from Mr. J. W. Alexander, Chairman of the Committee on Merchant Marine and Fisheries re the Seamen's bill:

Gallatin, Mo., July 13, 1915.

The Maritime Exchange,
78 Broad Street,
New York City.

Dear Sirs:

I am just in receipt of a letter from your President and Secretary, of date June 28th, transmitting resolutions adopted by the Board of Directors of the Maritime Association of the Port of New York, referring to the Seamen's bill, which became a law on the fourth of March last, condemning the law and strongly urging its repeal and going on to state that the President would be fully justified in calling an extra session of Congress for the repeal of this law before its ruinous provisions shall become effective.

While this law may not be pleasing to you in all its phases, yet I would be very glad to have you point out the provisions of the law to which you object. I do not agree with you that the enforcement of this law will be as disastrous as claimed. I have had occasion to discuss the provisions of the law with Mr. Schwerin by letter and with Captain Robert Dollar in person. As you doubtless know, Captain Dollar's ships were under the British flag up to the time of the war in Europe, and he only brought them under the American flag to have and enjoy the rights of neutrals, and if the Seamen's bill were not in force he would transfer them to the British flag as soon as the war is over if thereby he could diminish the cost of operation. So far as the Pacific Mail is concerned it may be that the company will discontinue service after the first of November, and while Mr. Schwerin has given out interviews to the effect that it is because of the passage of the Seamen's bill, the "Wall Street Journal," of June 16, contained the following comment from Washington:

"It is reported here that the parties negotiating for purchase of the ships of the Pacific Mail Steamship Company plan to establish headquarters in New York and operate the ships to Hong Kong via the Panama Canal, after transforming them to oil-burners, a change which would reduce the fire-room crew from 118 to 18 men. This operation through to the Atlantic coast would enable the company to continue to compete for at least its present share of traffic, something the Company cannot do so long as it is controlled by a railroad company, because that prevents its use of the Canal."

You do not seem to be aware that the Seamen's bill places foreign shipping departing from our points under the same requirements as it does American shipping, and it may be that the fact it does apply to foreign shipping has something to do with the attitude toward the law. However, if a bill or bills would be introduced at the next session of Congress to repeal any of the provisions of the law, and the opponents of the present law wish to come before my Committee, they will be given an opportunity to be heard, and as Chairman of the Committee on Merchant Marine and Fisheries I wish to assure you that any objections shall receive my best consideration. I have labored hard to build up an American merchant marine, and am fully aware of the obstacles that must be overcome before this can be accomplished.

Yours very truly,

(Signed) J. W. Alexander,
Chairman.

It is extremely hard to understand Mr. Alexander's views on the Seamen's Act. His references to Captain Robert Dollar are certainly not fair nor are they in keeping with facts. The Dollar steamers were never in need of the so-called protection afforded by the stars and stripes and if what Mr. Alexander implies is true, these vessels would never have been brought in under American registry. Captain Dollar's expressed desires to see a large American merchant marine engaged in the over-seas trade are not new nor do they date from the inception of the European war, his stated opinions have been the same for the past twenty years.

In the second paragraph of his letter, Mr. Alexander assumes that the "Wall Street Journal" knows more about the Pacific Mail Steamship Company than its Vice-President and General Manager. This is neither a reasonable nor a fair assumption for there are numerous newspapers and journals throughout the length and breadth of the land, many of them just as reliable as the "Wall Street Journal," who have sold the Pacific Mail fleet to Japanese, Chinese, English and numerous other owners.

From the last paragraph of his letter it would seem that Mr. Alexander is of the opinion that the provisions of the Seamen's Act are going to "stick" as far as foreign shipping calling at American ports is concerned. We must confess that we cannot follow Mr. Alexander's lead this far. A large proportion of foreign shipping visiting our ports is already out from under the provisions of the Act and by the time the measure becomes fully effective the amount of foreign shipping it affects will be negligible.

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Freight Report

By PAGE BROTHERS

Since our last report in July, the volume of business from San Francisco to U. K. has been small. Balfour, Guthrie & Co. have chartered the French bark "Francois d'Amboise" to load barley from this port to U. K. at 85/-, and the steamer "Matoppo" to load a general cargo to Liverpool or London, presumably, at about 95/- to 97/6. The rate has been kept private.

From the North, Mr. M. H. Houser succeeded in getting "Strinda" at 92/6 to U. K., followed by the Portland Flour Mills paying 95/- for steamer "Volga." Mr. Houser paid 81/3 for the sailer "Port Caledonia," November loading, 80/- December loading, and also chartered the "Tokai Maru" from Comyn, Mackall & Co. on private terms, with options of Australia, though she is reported as sold to an Irish port. Kerr, Gifford & Co. chartered steamer "Rosalie" at 95/, which (on passage from England here) struck a mine and was beached by the master. Kerr, Gifford & Co. have since taken the "Lady Carrington" at 93/9 in her place. They also chartered the "Highbury," and got her at 92/6, owing to her being so close up. Steamer "Reading" was chartered by Strauss & Co. at 95/- U. K., option of 97/6 France, and 100/- to Naples, and different shippers have taken steamers "Snowdonian" and "Baron Lovat" at 95/-, at which rate the market closes very steady.

Lumber freights have been less active, as most of the nearby vessels have been fixed. There have been no charters for lumber to the West Coast, and several schooners have been chartered for Sydney, at 95/-, options of Melbourne, Adelaide or Port Pirie at 105/-, and one Japanese steamer, we hear, has broken the rate to Melbourne by accepting 100/- per M. Frank Waterhouse & Co. have chartered two Japanese steamers for delivery and redelivery Japan, one round for the Pacific, at 10/9 on the dead weight.

For Africa, nothing has been done.

For U. K. Messrs. A. F. Thane & Co. have chartered the steamer "Hackensack" on time, for delivery at Norfolk, Va., to this coast, and redelivery at U. K. on a basis of about 15/-.

The British Government has supplied the lumber mills of British Columbia with two steamers to carry their lumber to England, namely, the "Grahamland" and the "Llandudno," but the rates of freight charged do not appear.

Mr. G. W. McNear, finding it hard to get American vessels for his Scandinavian business, purchased the American bark "Andrew Welch" at $45,000, and she is now about ready to sail with a cargo of beans and other California products to a port in Sweden, for his account. He has also chartered American steamer "Newton" to carry coal from Norfolk, Va., to this port at $5.25 per ton, and thence with general cargo from here to Scandinavia. The steamer was chartered on time on private terms.

Demand for Australia for wheat, barley and hay from this Coast has ceased temporarily, and probably, with the exception of one or two small cargoes, it is not likely that any more of our products will be needed there, as there is every indication that the Australian Colonies are going to have a banner crop.

Early California Maritime Cases

By WILBUR BASSETT, Proctor in Admiralty

(Continued from August Number.)

This false precedent laid down by this early Court continues to the present day to cause our Courts to give to the Vessels Act a construction entirely out of harmony with the purposes and history of the Act and only defensible upon this courteous theory of the omnipotent power of legislation. We are accustomed to the loud outcry against Court decisions which refuse to follow the literal word of statutes or construe them in the light of their source and history, but here we are concerned with a line of decisions which ignores the history and parallels of an act and continues to adopt a weak and unsupported early decision, whose anomalies the Court charges to the omnipotent power of legislation.

Our Courts could not proceed much farther without directly facing the question whether or not California was entirely independent of the Courts of the Union and in Johnson vs. Gordon, 4 Cal., 368, decided at the October term, 1854, Mr. Justice Heydenfeldt boldly cut the line and cast the ship adrift. Here the Court decided that the Constitution of the United States gave no authority for exclusive jurisdiction in the Federal Courts; that no cause could be transferred from the State Court and that the Courts of California would not recognize a writ of error from the Supreme Court of the United States. The decision reads: "The appeal is only allowed where the decision of the State Court is adverse to the law of

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Congress or treaty, etc. If, therefore, one State affirms the validity of a law of Congress, and another State declares it void, if the Supreme Court of the United States sustains the latter, the rule will be different in the two States. Indeed, as long as the age of the world continues to be of great intellectual vigor, uniformity of opinion is and must be unattainable. It is the chimera of an unhealthy brain, because it is incompatible with the known characteristics of the human intellect. To secure it in a few given cases, while we lack it for all the rest is not an object of sufficient magnitude to overturn elementary doctrines of construction, and to destroy the harmony of a rule which determines satisfactorily the principles of the organization of a complex system of government.

"For these reasons we hold:

"1st, That no cause can be transferred from a State Court to any Court of the United States.

"2nd, That neither a writ of error nor appeal lies to take a case from a State Court to the Supreme Court of the United States."

The following year a Portland steamer, the "Columbia," was libeled in the State Courts and the objection was made upon appeal, apparently for the first time, that the Judiciary Act of 1789 had given the Federal Courts exclusive jurisdiction of proceedings in rem. We have seen, however, that the temper of the Court was quite ready for this objection when it should be made, and Justice Heydenfeldt relied upon his decision in Gordon vs. Johnson, holding that Congress had no power to make this jurisdiction exclusive in the Federal Courts, and that his Court was not bound by the acts of 1789. The Court had already forgotten that it had decided service and not possession to be the basis of jurisdiction and supports its specious argument by saying: "In marine cases jurisdiction is acquired by seizure of the thing which, when once seized, must be disposed of by the Court whose process holds it." In our most recent case we find this principle still tossed in the air and allowed to bounce where it will.

A rather humorous case is reported as Martin White vs. Steam-Tug "Mary Ann," in 6 Cal., 462. The briefs do not raise the question of the right to proceed directly against the vessel but it is soberly argued that the service for which payment was demanded was a towage charge and that this was not within the words of the statute "a contract for the transportation of persons or property," Mr. Justice Heydenfeldt, who had already disposed of so many marine questions, decided that the contract of towage was a contract to transport property and the judgment was sustained. The next important marine case was Meiggs vs. Scannell, reported in 7 Cal., 405. This was an action to recover from the defendant, who was sheriff of San Francisco, the bark "Madonna." It appears that one Conway had proceeded against the "Madonna" under the Vessels Act but had not levied any attachment; in other words, that he had relied upon Averill vs The Steamer "Hartford," to which we have already referred, in which it was said personal service was equivalent to seizure. Before Conway recovered any judgment the vessel was sold to Meiggs. After judgment in favor of Conway, the sheriff seized the vessel in Meiggs' hands. We have noted that the Supreme Court had laid down the rule that seizure conferred jurisdiction so that we might suppose it would say in this case that an innocent purchaser before seizure could not be defeated by a judgment in an action then pending. This is the only logical conclusion to which one can arrive, for if seizure is essential to jurisdiction, and the action proceeds to judgment without seizure the Court has no jurisdiction and cannot afterwards seize the vessel upon pretense of carrying out its judgment. But the Court which had decided Johnson vs. Gordon found no difficulties in this situation and fell back upon the theory that personal service was equivalent to seizure, a species of left-hand deduction so popular in the Mexican courts. Chief Justice Murray openly ignores the State statute and supposes his Court to be a general Court of Admiralty, independent of any legislation, and as a matter of divine right. He says: "It makes no difference for the purpose of this case whether the statute actually gives a lien or not for the service rendered, thing done, or supplies furnished. As soon as the vessel is seized by a Court of Admiralty a lien attaches in favor of the party at whose suit the seizure is made. . . . I do not think that it was the intention of the Legislature to provide that a lien should only be acquired by attachment. This would virtually be denying a right to creditors for small sums." We stand aghast at such legal curiosities, which may well be ranked with the New England verdicts against witches, and yet the case is not to be treated lightly for it still contains elements of very grave danger. It is but a few days, comparatively speaking, since Mr. Justice Angellotti, writing the decision in Jensen vs. Dorr, 116 Pac., 553, said: "The existence of the liens declared by Section 813, Code of Civil Procedure, is not dependent upon the attachment of the vessel. The claimant has such a lien which he may enforce by action, whether he attaches or not, the attachment remedy being given simply for more adequate security. This was early determined in this State in the light of certain sections of the practice act, differing in no respect materially to this question from Section 813 of such Code of Civil Procedure. See Meiggs vs. Scannell, 7 Cal., 408. The views expressed in the case last cited have never been departed from." Upon petition for rehearing the Court, which for decades had asserted that it was its unalterable practice either to stand by its decision as given or grant a rehearing, deftly expunged the above paragraph from its decision and denied a rehearing.

Looking again at Meiggs vs. Scannell we might

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admit that it had never been departed from and assert that it contains no "point of departure." There is no element of the decision which is consonant with any principle of admiralty or of Marine law or of State liens, and the case stands desolate and alone as a terrible example from our early history. The decision is an impossible jumble of false theories and of confusions between rights and remedies. For the layman as for the lawyer it must be a matter of infinite wonder that the decision in Meiggs vs. Scannell that a lien attaches "as soon as a vessel is seized by a court of Admiralty" can even today be cited by our Supreme Court as establishing the contrary doctrine that "the existence of the lien is not dependent upon the attachment of the vessel." We are today no nearer a correct or logical interpretation of the Vessels Act than in 1854.

The statute, as contained in the Practice Act, did not have the concluding paragraph of our present statute, which provides that "demands for these several causes constitute liens," and in Fisher vs. White, 8 Cal., 418, in a suit over the steam tug "Mary Ann," Justice Barnett ignores the intention and history of the statute and decides that it was not the intention of the Legislature to give rights in favor of shipbuilders and supply men at the home port by giving rights and remedies similar to those in admiralty, but that it was apparent from the act that no lien attached without possession and that such possession was constructively had under the authority of Averill vs. The Steamer "Hartford" by personal service. Here again the Court confuses the right with the remedy and makes no distinction between the ownership which any claimant has by reason of his lien and the ownership which he acquires by process for the enforcement of the lien.

The anomalies of these early cases were ably argued in Warner vs. Steamship "Uncle Sam," reported in 9 Cal., 697, decided in 1858. The action was under the statute for damages for having left certain passengers in New Granada en route to New York by Nicaragua. It was again objected that the Court had no jurisdiction because the ship was a foreign vessel and the injury complained of was outside the State. Justice Barnett wrote a lengthy decision in which the Court again held that it was the intention of the Judiciary Act of 1789 to vest exclusive admiralty jurisdiction in the Federal Courts, but that Congress had no authority to pass that act. It is interesting to note that Justice Field was a member of the Court and concurred in its conclusions, "until the question of exclusive jurisdiction in the Federal Courts is directly passed upon by the Supreme Court of the United States and the jurisdiction to the exclusion of all cognizance by the State Courts is affirmed." We shall see that it was he who was destined, as a Justice of the Supreme Court of the United States, to make this decision in the "Moses Taylor," and thus repudiate the position which he had taken as a Justice of the State Court. The same questions were raised in the suit of another passenger upon the same vessel, in Ord vs. Steamer "Uncle Sam," at the April term, 1859, and the Court adhered to its former position.

So, at the outbreak of the Civil War we find our Courts refusing to recognize a writ of error from the Supreme Court of the United States, refusing to be bound by the Judiciary Act of 1789, maintaining original admiralty jurisdiction upon theories never recognized in any Admiralty Courts, and hearing causes against foreign and domestic vessels of every flag, for claims known and unknown to maritime forums, with fantastic modes of procedure which swept aside the earnest arguments of counsel and repudiated the body of maritime law which was already in force. In the near future we hope to trace the later struggles of our Courts and show that the vicious results of these ill-considered early cases live today and that the present construction put upon our Vessels Act is no less erroneous than that of ante-bellum days.

General Average on War-Bound Vessels

IT IS a well-known fact that on the outbreak of the present hostilities in Europe all German ships at sea having means of communication with the land were advised of the commencement of war and were instructed to seek the nearest neutral port and there remain until further advised. As a result of this, many German steamers bound for neutral ports with a non-contraband cargo sought ports of safety and many of them, with their cargoes, still remain in seclusion and safety.

Shortly after this action on the part of the owners of German ships, many of which were bound to ports in the United States, consignees of cargo became restive and started inquiries as to how to obtain possession of their goods for which they had paid and for the delivery of which they had contracted with the carrier, in many cases prepaying the freight as a part of the contract, such prepayment being absolute and without any right of recovery. Many of the consignees were notified by the carriers that they had arranged, or would arrange, to charter a neutral vessel to carry to destination the forcibly detained cargo, but they demanded, first, an additional amount of freight for the services of the forwarding vessel, claiming that by the terms of the original bill of lading the original prepaid freight was earned even

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Truisms Concerning San Francisco in her relation to

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UTLET

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MPORTS

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PPORTUNITIES

N EWEST
AVY YARD

THE adjoining interpretation of water transportation's relationship to San Francisco was prepared by Mr. R. C. Thackara of the Luckenbach Steamship Company for the purpose of calling the attention of the members of the Trade Section of the Rotary Club to a Water Transportation Luncheon held July 19th. The cleverness of, what might be termed, this word etching of San Francisco's heritage becomes more and more apparent as these trite truisms are studied.

With the Congress of our great country enacting measures pertaining to the use of the sea by every nation on earth, measures that contain provisions which every country of any importance will bitterly resent and which may eventually plunge us into a labyrinth of international disputes which cannot but end disastrously to our trade relations with other people, it is a good thing to have called to our minds just what water borne commerce means, not only to our seaboard cities, but also to the entire nation.

Exports, imports and trade upon the sea form the warp and woof of San Francisco's greatness and it is with the flowing white threads formed in the wake of tall ships that the Fates are weaving out the destinies of our fair city and her neighboring seaports north and south. From time immemorial cities have risen and fallen as they have utilized or wasted their opportunities on the sea, and realizing what the proper use of the ocean means to the community by the Golden Gate, let us try to understand the full meaning and latent possibilities of Water Transportation and so shape our efforts that the fulness of a noble and glorious heritage may be ours.

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FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

though the goods had not been delivered, and second, a cash deposit of from 10% to 20% of the invoice value of the goods to cover "general average charges."

As to the legality of the demand for additional freight, there was sufficient doubt to induce many consignees, who were anxious for their goods, to agree to the payment, but as to the legality of the second demand for a cash deposit to cover alleged general average charges there is sufficient doubt to warrant consignees in refusing to accede and to appeal to the courts for delivery of their goods and for damages caused by delay. Or if the exigencies are such that an appeal to law is undesirable, then to furnish security in such a way that their legal rights will be fully protected.

The contention of the German shipowners is that this demand is fully justified by the provisions of the German Code, which, in this connection, are as follows:

Paragraph 635:

Should the ship be compelled, after having loaded the cargo, to remain at the loading port, prior to the commencement of the voyage, or, at an intermediary port or port of refuge, after having proceeded on the voyage, owing to any of the events mentioned in Paragraph 629, the cost of her stay in port is to be divided between the ship, freight and cargo, on the basis of General Average, although the requirements for General Average do not exist, and no matter whether the contract is thereupon revoked or completely fulfilled.

The cost of the stay includes all expenses enumerated in Paragraph 706, No. 4, Chapter 2: the expense of entering and leaving port only, however, if on account of the obstacle, a port of refuge has been entered.

Paragraph 629:

Each party is permitted to withdraw from the contract without being bound to an indemnity:

1. If prior to the commencement of the voyage, the ship has been placed under embargo, or seized for the service of the Empire or a foreign power,
   the commerce with the port of destination is prohibited,
   the loading port, or port of destination is blockaded,
   the exportation of the goods to be shipped according to contract from port of shipment, or their importation in the port of destination, is prohibited,
   the ship is prevented from clearing by another decree from high authority, or the voyage, or the shipment of the goods to be shipped in accordance with the freight contract, is prevented.
   In all these cases, the decree of the authorities justifies a withdrawal, only if the interceding obstacle is prospectively not of inconsiderable duration.
2. If a war breaks out prior to the commencement of the voyage, in consequence of which the ship, or the goods to be shipped in accordance with the freight contract, or both, can not be any longer considered free, and are exposed to the danger of seizure.

The exercise of the authority given the shipper in Paragraph 562 is not excluded through this order.

Paragraph 562:

The carrier is obliged to accept, instead of the goods contracted for, other goods offered him by the shipper, for shipment to the same destination, if his position is thereby not aggravated; this order is not to be applied if the goods are not only mentioned in the contract according to kind or class, but specifically defined.

Paragraph 706, No. 4—Chapter 2:

In this case, the following expenses are included in General Average:

the expense of entering and leaving port,
the cost of stay in port for the ship itself,
the wages and provisions due the crew during the ship's stay in port,
the expense for lodging the crew on shore, so long as the crew can not remain on board; furthermore, if the cargo has to be discharged, owing to the reason which necessitates her entering the port of refuge, the expense of conveyance from

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and to ship, as well as the expense of storing the cargo on shore, up to the time that it can again be brought on board.

It is difficult to see wherein the Code justifies the present contention. In Paragraph 629 it is distinctly stated that each party is permitted to withdraw from the contract without being bound to an indemnity if a war breaks out PRIOR TO THE COMMENCEMENT OF THE VOYAGE, in consequence of which the ship or the goods or both can not be any longer considered free and are exposed to the danger of seizure, and in Paragraph 635 it is stated that should the ship be compelled to remain at an intermediary port or port of refuge owing to any of the events mentioned in Paragraph 629, etc., etc. The whole question would seem to be predicated on whether or not war broke out prior to the commencement of the voyage.

It is possible that the translation of the Code is faulty and that a strict interpretation, by German courts, would uphold the ship-owners, but even if this is the case, the doctrine is utterly at variance with the laws of all maritime nations regarding the adjustment of a general average and what conditions would justify a general average claim. It is the general law that, unless otherwise expressly agreed to, a statement of general average shall be drawn up according to the laws of the port of destination, or of an intermediate port if the voyage be broken up at such port, and the fundamental principle of the application of general average that there must be an imminent peril common to all interests and a sacrifice to preserve all interests from that peril. When a sacrifice is made for the interest of but one party to the venture, such as the ship alone or the cargo alone, there is no community of interest in that sacrifice, therefore no general average.

In the cases under discussion there was no imminent peril common to all interests. There was a peril to the ships, imminent or remote, that they might be captured and condemned, but there was no such peril to the cargoes inasmuch as they were non-contraband, and were consigned to neutral ports. The only danger to which the cargo was exposed was that of delay in delivery, and certainly this danger was not averted by the ship seeking a neutral port to wait until such time as it would be safe for her to proceed on her voyage. The sacrifice, that of seeking a port of refuge to avoid possible capture, was made in the interest of the ships alone, and the expenses of such a deviation are not of a general average nature and can not be claimed as such.

The first court decision touching this situation is reported in a recent issue of "The Weekly Gazette Shipping Summary." It appears that prior to the declaration of war certain consignments of milk products were made from Hamburg to the Straits Settlements and Chinese ports by a Hamburg-American liner. On receiving word of the hostilities the steamer put into Sabang, Sumatra. The owners of the consignments, through agents appointed for the purpose, made demand on the master of the steamer, the "Scandia," for delivery of the goods at Sebang, and being refused, brought action in the High Court of Medan.

The defendant contended that the court was incompetent to deal with the claim, as there was a dispute as to the meaning of some rule on the back of the bills of lading which could only be decided by the judge in Hamburg. To this the court ruled that the "execution of an agreement is subject to the law of the place where the agreement is solved." Then it was contended that the port of destination had not been reached and therefore delivery could not be demanded, but the court took the view that the clause "or as near . . . as the ship can proceed in safety" came into operation. Then the surrender of the entire set of the bills of lading was demanded, as provided for in the German Code, but the court held that the Dutch Code should apply which provided that as between the consignee and the master "each copy is considered as representing all copies of the bill of lading."

Then it was contended that delivery could not be demanded without the claimants paying their share in the general average. Here the court found that the bills of lading provided for the application of York-Antwerp rules and that under these rules general average could only be demanded if entry into the port of refuge had taken place for the "common

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safety," which was not the fact in the case at bar. Judgment was given for the plaintiffs for delivery of the goods and also for the loss caused by the delay in delivery.

In commenting on the case the "Shipping Gazette" says:

"The only object that can be suggested" (in the refusal to deliver the cargo) "seems to be that the German master had the remote hope that by the fortune of war, at some time or other the opportunity would come to confiscate the cargo as belonging to owners who were not Germans."

This conclusion seems rather far-fetched. It would seem more likely that the master was appealing for the application of the German Code in order that the owners might recover from the cargo interests some part, at least, of the heavy expenses incurred in holding the ship at, for her, a port of refuge with an entire crew that must be paid and fed.

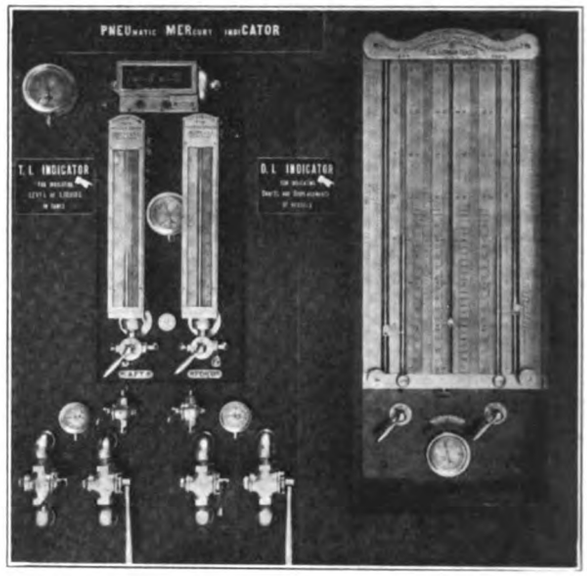
With Those Who Do Things

THE PNEUMERCATOR.

We published in our August issue abstract of a very able article written by Mr. Henderson B. Gregory, Associate of the American Society of Naval Engineers, giving a description of the installation and operation of the Pneumercator. This article originally appeared in the Journal of the American Society of Naval Engineers for May, 1915, and has attracted considerable attention from marine engineers and others interested, since it has been put scientifically on record by such an authority as Mr. Gregory.

In connection with said article we would like to call attention to the exhibit of the Pneumercator Company, manufacturers of this instrument, in the Machinery Building at the Exposition.

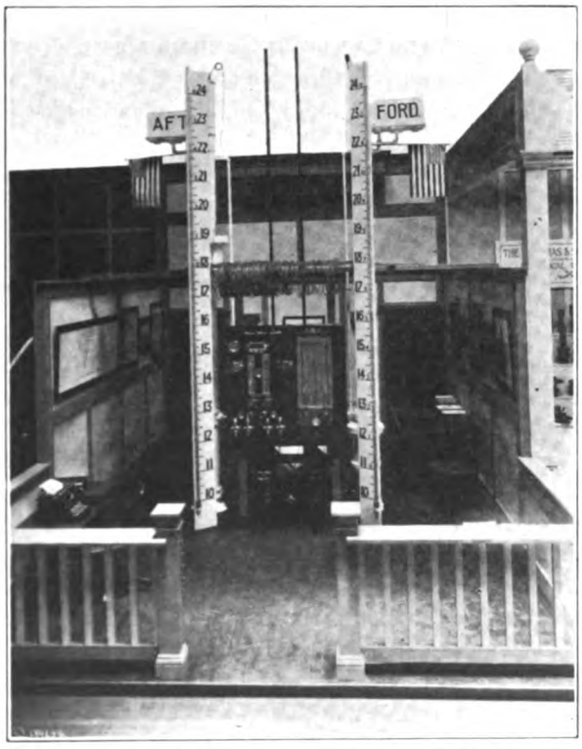
For the purpose of giving a demonstration or working test of the instruments, the manufacturers have arranged the exhibit to show two boards calibrated in feet and inches, designated as "Forward" and "Aft," which represent the D-I instrument for measuring Forward and Aft draft and displacement



A Board Mounted with the Recording Instruments of Pneumercator Systems

of vessels. These boards, as will be noted, have a glass gauge in front and are connected with the D-I Balance Chambers, the two large chambers seen below the instruments, and means are provided by the four valves shown, to empty and fill two tanks, one on each side, to varying levels of water, showing same in the glass tubes on the boards, and indicating at a glance the corresponding height as indicated on the mercury columns of the instrument. The tanks in this case are made of 4" pipe and it will be noted are set back of the boards, being both connected with the D-I Balance Chambers, as already stated, and arranged to work also in connection with the Tank or T-I types of instrument, one T-I Balance Chamber being placed above the instrument, as shown on the left, and one T-I Balance Chamber below the instrument, as shown on the right hand of the photograph.

We take pleasure in calling attention to the ex-



General View of the Pneumercator Exhibit at the Panama-Pacific International Exposition

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Who Built the Panama Canal?

Major-General GEORGE W. GOETHALS, of course

Who will preside over the Sessions of the International Engineering Congress?

Major-General GEORGE W. GOETHALS

AFTER a careful perusal of the program of the International Engineering Congress, the PACIFIC MARINE REVIEW is of the opinion that any engineer who fails to avail himself of the opportunity to secure at least those volumes dealing with the branches of engineering in which he is interested is making a grievous mistake.

THE CONGRESS IS ORGANIZED AND CONDUCTED UNDER THE AUSPICES OF

American Society of Civil Engineers
American Society of Mechanical Engineers
American Institute of Mining Engineers
American Institute of Electrical Engineers
The Society of Naval Architects and Marine Engineers

It is not surprising, therefore, that the demand for the bound volumes of transactions is so great. The engineering progress of the world is summarized and discussed by the recognized experts of

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GREAT BRITAIN	RUSSIA	AUSTRIA	THE NETHERLANDS
SOUTH AFRICA	CANADA	ITALY	SPAIN
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And the astonishing part is that on payment of $5 ($5.50 for cloth binding) anyone may become a member of the Congress and obtain, without extra charge, his choice of any one volume of the transactions. Here is the schedule of prices to members for additional volumes:

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Foxcroft Building, San Francisco

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hibit, not only for the unique and careful mechanical way in which it has been installed, which was done under the supervision of Mr. Harry S. Parks, Chief Engineer of the Pneumercator Company, who came out here from Philadelphia for that purpose, but also to call attention to the facilities for demonstration, which are being conducted for those interested, by Mr. James C. H. Ferguson, Engineer and Pacific Coast Representative of the Pneumercator Company, who is in daily attendance at the exhibit booth.

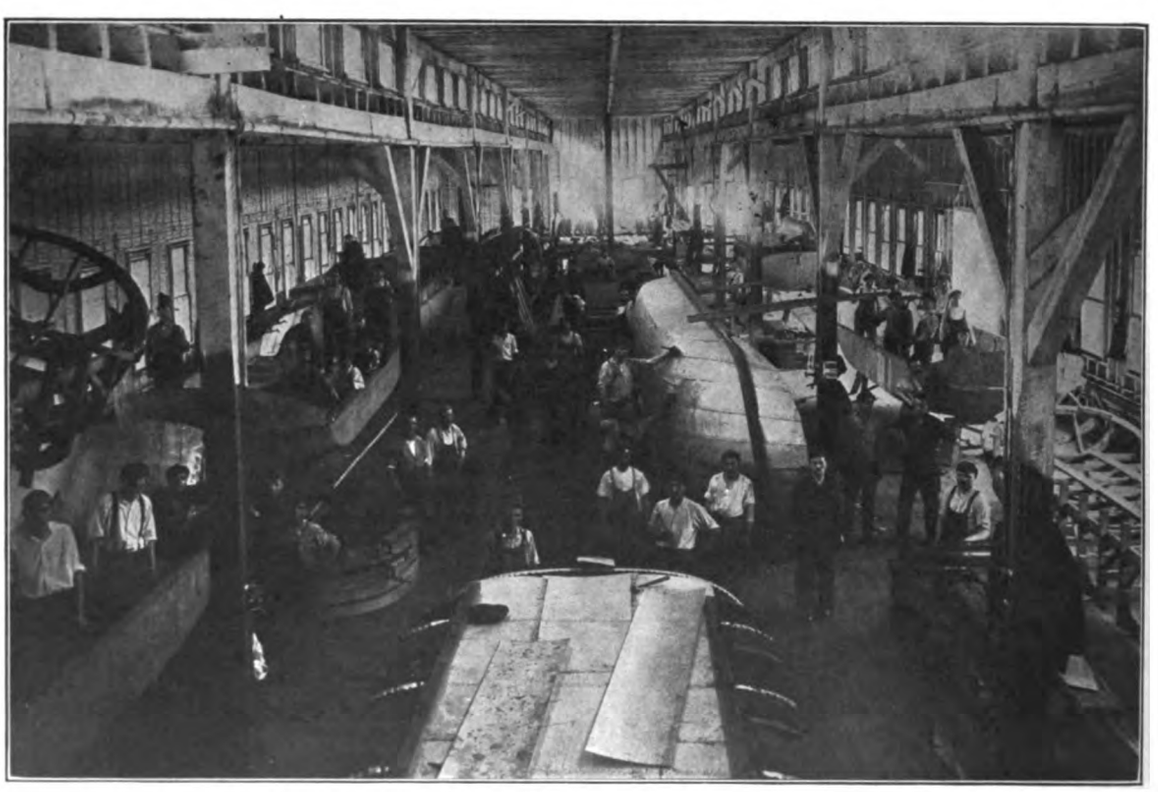
We believe a critical inspection of the exhibit will be worth while and of interest to all engineers, whether marine or engaged in land work or consulting practice.

The Pneumercator Company have many and important installations on the way, both for marine and for stationary purposes. Particularly worthy of note on this Coast should be mentioned the equipping of the U. S. Navy tankers "Kanawha" and "Maumee," built at the Mare Island Navy Yard with T-I Pneumercators throughout, for the fuel oil as well as cargo storage tanks, and also D-I instruments for weighing the entire ship with contents of all the tanks.

WELIN MARINE EQUIPMENT COMPANY.

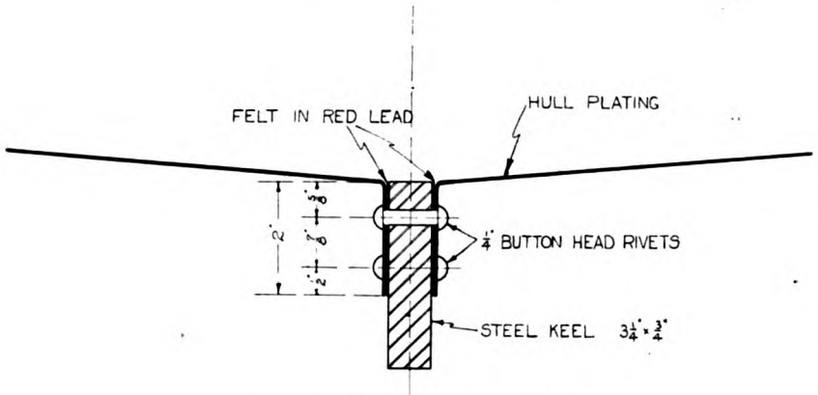
The Welin Marine Equipment Company was founded in 1906 by Captain A. P. Lundin and Axel Welin, and yet this firm name during the past ten years has become almost synonymous with lifeboats and davits. Before the Welin quadrant davit came to be generally adopted, there had been some two hundred different types of davits on the market, but the advent of the quadrant davit marked such a distinct advance in davit design and utility that to-day there are over 12,000 sets of them in use. In 1908 Captain Lundin, who had been working over lifeboat problems for years, bought out the Lane & DeGroot Company, which was then in difficulties. Under the management of Captain Lundin, this boat building establishment was quadrupled in capacity, modern macinery and labor-saving devices were introduced and new shops erected to meet the heavy demand for improved and efficient lifeboats. After the loss of the "Titanic," the semi-collapsible Lundin lifeboat was brought out, demonstrated before the International Congress on Safety of Life at Sea in London in 1913 and pronounced a great success in every way. This new type of lifeboat has many advantages, among which are increased stability due to double bottom subdivisions and large balsa wood fenders, its reserve buoyancy is sufficient to enable it to take care of as many people as can crowd into it and should it be overturned its utility as a means of saving life is only slightly impaired as it makes an excellent raft when inverted.

Perhaps the outstanding feature about the Welin Marine Equipment Company's organization is the incessant research work that has been carried on by the heads of the firm and their assistants.

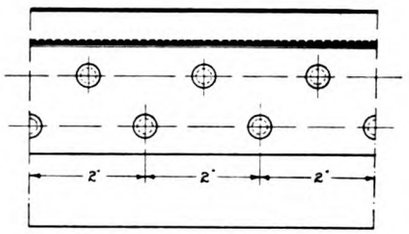


One of the Boat Shops at the Welin Marine Equipment Company's Plant

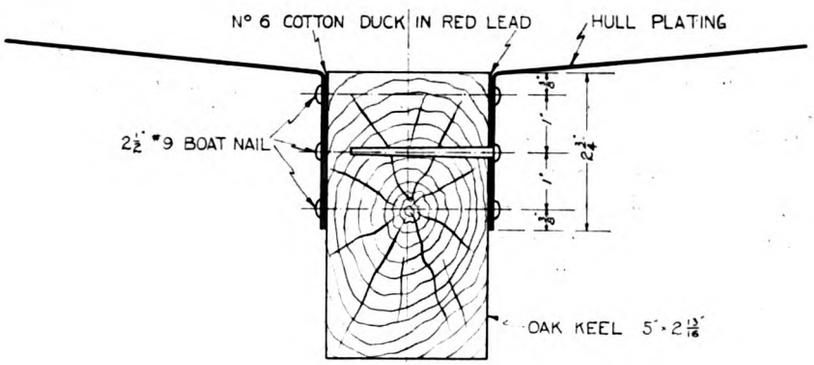
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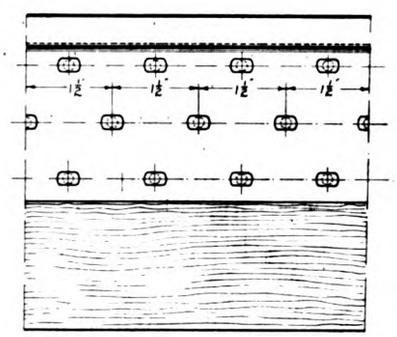
CROSS SECTION STEEL KEEL



SIDE VIEW STEEL KEEL



CROSS SECTION WOOD KEEL



SIDE VIEW WOOD KEEL

Experimenting is carried on continually not only with davits and the various types of lifeboats manufactured or contemplated, but also with life preservers, buoys, fenders, etc. One of the improvements recently incorporated in the Welin Marine Equipment Company's boats is the introduction of the steel keel on all metal craft. Owing to the checking and warping of wooden keels it was found exceedingly difficult to insure tightness where the garboards joined the wood. The unequal contraction and expansion of the wood and metal made the nails loose and liable to pull out and at the same time wood and metal do not make a good joint for rust proofing. The use of rolled bar steel keels 3¼" by ¾" in size has proven a great improvement in the durability and stiffness of all types of lifeboats and is illustrative of the efforts being constantly put forth by the Welin Marine Equipment Company to improve their output.

WHITE BROTHERS
HARDWOOD LUMBER
FLOORING
VENEERS
PANELS
ETC., ETC.
FIFTH AND BRANNAN STS.
SAN FRANCISCO
INDIANA BENDING OAK - TEAK - ASH
WHITE CEDAR - IRON BARK - MAHOGANY
LONG OAK KEELS
EASTERN WHITE AND RED OAK, ETC.
WYBROLITE WATERPROOF VENEER PANELS
THE LARGEST STOCK OF HARDWOODS IN THE WEST



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SOME RECENT BOLINDER INSTALLATIONS.

Up to the end of July the following Bolinder installations had been successfully carried out in the United States and the success of this class of semi-Diesel engine now seems to be firmly established:

One 50 horse-power, two-cylinder, direct reversible marine engine in the tugboat "Fragoso," belonging to Messrs. Pedro Rodriguez and Company, Havana, Cuba. Two 50 horse-power, two-cylinder, direct reversible marine engines for the cotton-carrying barge "Ocmulgee" of the Macon Atlantic Navigation Company of Macon, Georgia. One 100 horse-power, four-cylinder, direct reversible marine engine for water supply boat "Aquadon" of the Boston Provision and Ship Supply Company of New York. Two 30 horse-power, two-cylinder, direct reversible marine engines for a shallow draft passenger boat plying on the Magdalena River, Colombia, South America. Two 320 horse-power, four-cylinder, stationary engines to run in parallel with direct connected alternators for the mines of the Butters, Divisadero Company, Central America. One 80 horse-power, two-cylinder, direct reversible marine engine for the auxiliary schooner "Gilbert Islands" to the order of Tiy Sang Company, Sydney, Australia. One 50 horse-power, two-cylinder, stationary engine to operate the auxiliary electric system on board the U. S. tank ship "Maumee." Two 75 horse-power, two-cylinder, stationary engines to run in parallel direct connected to two 80 cycle alternators for Borough of Butler, New Jersey. One 320 horse-power, four-cylinder, direct reversible marine engine for Standard Oil barge "No. 62," New York. Two 320 horse-power, four-cylinder, stationary engines, municipal power plant, Perth Amboy, New Jersey. Two 320 horse-power, four-cylinder, direct reversible marine engines for auxiliary sailing ship for the Smith Shipping Company, New York. Two 160 horse-power, two-cylinder, direct reversible marine engines for coastwise barge of J. H. King & Company, New York. One 160 horse-power, direct reversible marine engine in tugboat "Marie L. Hanlon," San Francisco. One 120 horse-power, direct reversible marine engine in pilot schooner "Gracie S," San Francisco.

The Bolinder-driven electric light set now being installed on the Government tanker "Maumee" consists of a 25 K.W. 125 volts compound wound General Electric Company generator direct connected to a 50 brake horse-power, two-cylinder, stationary, vertical, Bolinder heavy oil engine, the two being mounted on a common bed plate. Running at 375 revolutions, the guaranteed maximum fuel consumption per brake horse-power is .631 pounds at full load, .7 pounds at three-fourths load, and .8 pounds at one-half load, using fuel oil as low as 24 Baume, 120 degrees Fahrenheit flash point and 18,000 b.t.u.

White Brothers, the leading San Francisco hardwood dealers, in issuing their latest stock list have the following to say in regard to the business outlook:

"While the market has been especially depressed during the past year through the operation of the European war and the consequent closing down of many of the largest mills of the country, we have been alert and continued to buy while the prices were low. With the reopening of all the great steel and cotton mills of the country, the tremendous demand for our produce and wares which will surely follow the cessation of foreign hostilities, added to our bountiful crops of fruit and grain, we believe it sane to predict that a general industrial awakening is at hand and that now is the time to buy."

The United States Navy Department has awarded to the International Oxygen Company of New York the contract for the erection of a hydrogen generating plant for ballooning purposes at the aeronautic station of the Navy Yard at Pensacola, Florida.

The International Oxygen Company has also received the award from the Government for the installation of an I. O. C. system for generating oxygen and hydrogen at the Washington Navy Yard, Washington, D. C.

MAIL COSTS.

The article following is of peculiar interest at this time as it demonstrates clearly that "Ocean Mail Acts" are not subsidies in any sense of the term and that in regarding them as subsidies the Congress of of our country has succeeded in deluding the treasury out of no mean sum:

Mails between the United States and foreign countries are carried substantially in three ways.

In American steamers under the Act of 1891, by the terms of which these steamers, among other things, are available for use by this country in time of war.

By American steamers under the weight rule.

Principally by foreign steamers under the weight rule.

It actually cost the United States less in 1914 to carry mail in American steamers under the Act of 1891 than it did in foreign steamers.

All of this talk which has been current in those parts of the United States which have only a vague knowledge of salt water, to the effect that the Act of 1891 is a "subsidy," is plain misinformation.

The authority for this statement as to the cheapness of carrying mail in American steamers is found in the Report of the Postmaster-General for 1914. The exact language which he uses—and which seems to have been overlooked by the people who think it

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is cheaper to carry American mails under foreign flags—is:

"Contract ocean mail service under the provisions of the Ocean Mail Act of 1891 was in operation on five routes, namely from New York to Puerto Cabello, Venezuela; from New York to Maracaibo, Venezuela; from New York to Vera Cruz, Mexico; from New York to Southampton, England, and from San Francisco to Sydney, Australia. All mails not carried under the Ocean Mail Act are carried by non-contract vessels on the weight basis.

"The total cost of the contract service for the fiscal year of 1914 was $1,089,361.83, and the net cost of the service performed was $55,155.51, less than it would have been if the steamers performing it had not been under contract, and had conveyed the same mails and received pay on the weight basis."

Translated into terms of ordinary American English this means that the United States Government actually saved money by having such steamers as those of the American line on the Atlantic and the Oceanic line in the Pacific, to carry the mails. Were the Government to extend contracts to other lines, and to enlarge those it already has, there would not only be a growth of the American mercantile marine, but the Government would have fast ships ready for emergencies.

The Postmaster-General's report shows some things about cost of mail carrying that the general public does not know. For instance, in 1914 the cost of rail and steamer service was:

Paid railroads	$55,480,560.79
Paid steamers, American and foreign, and foreign service	3,868,364.72

The amounts paid in 1914 to the principal foreign companies for carrying American mail from New York to Europe was:

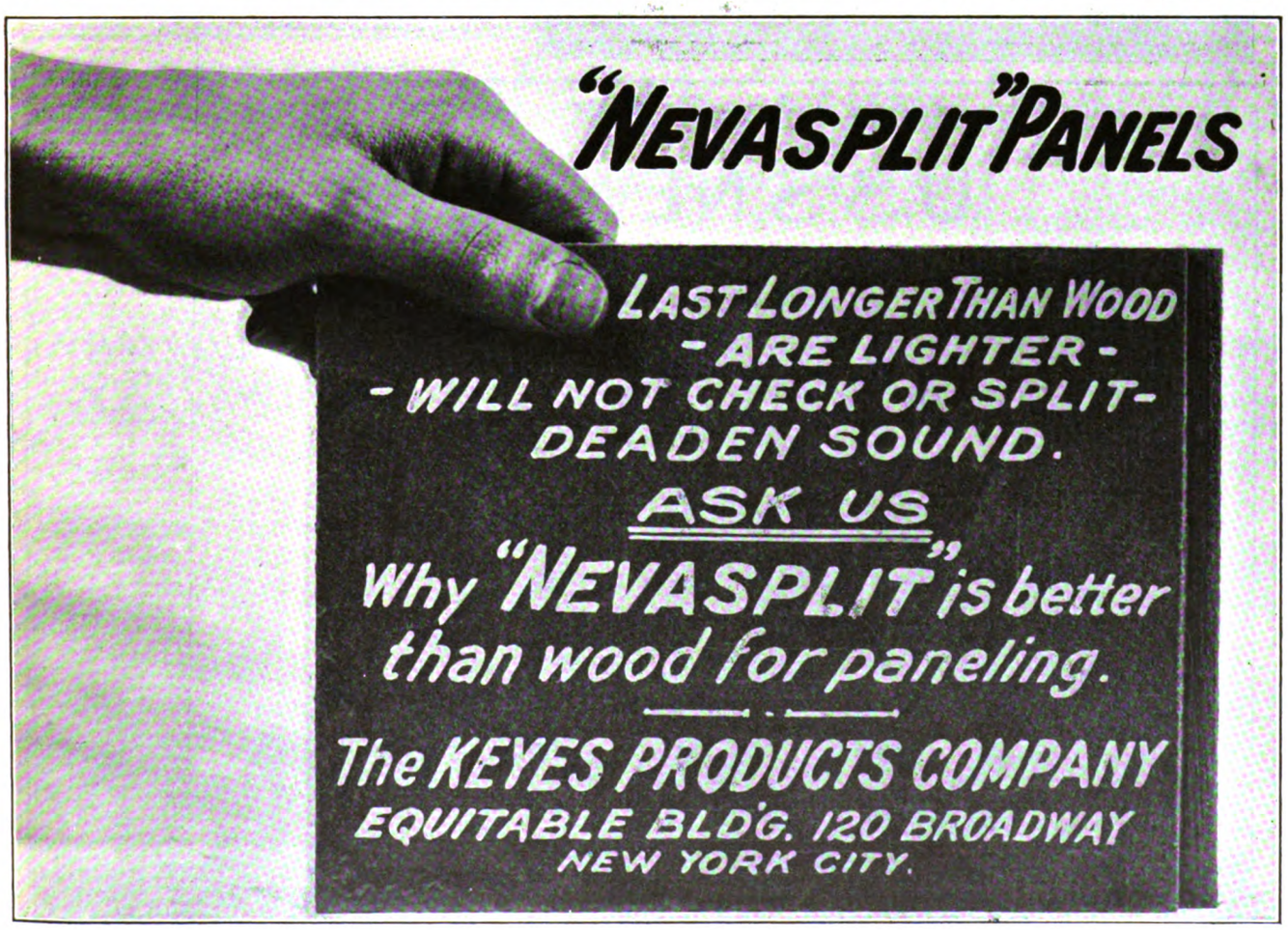
French line	$152,758.11
Cunard (British)	227,494.80
Hamburg-American (German)	83,296.26
North German Lloyd	363,789.58
White Star (British)	207,476.48

Compare these amounts with what the Government has put out in the Pacific, particularly the way the Pacific Mail Company has been handled:

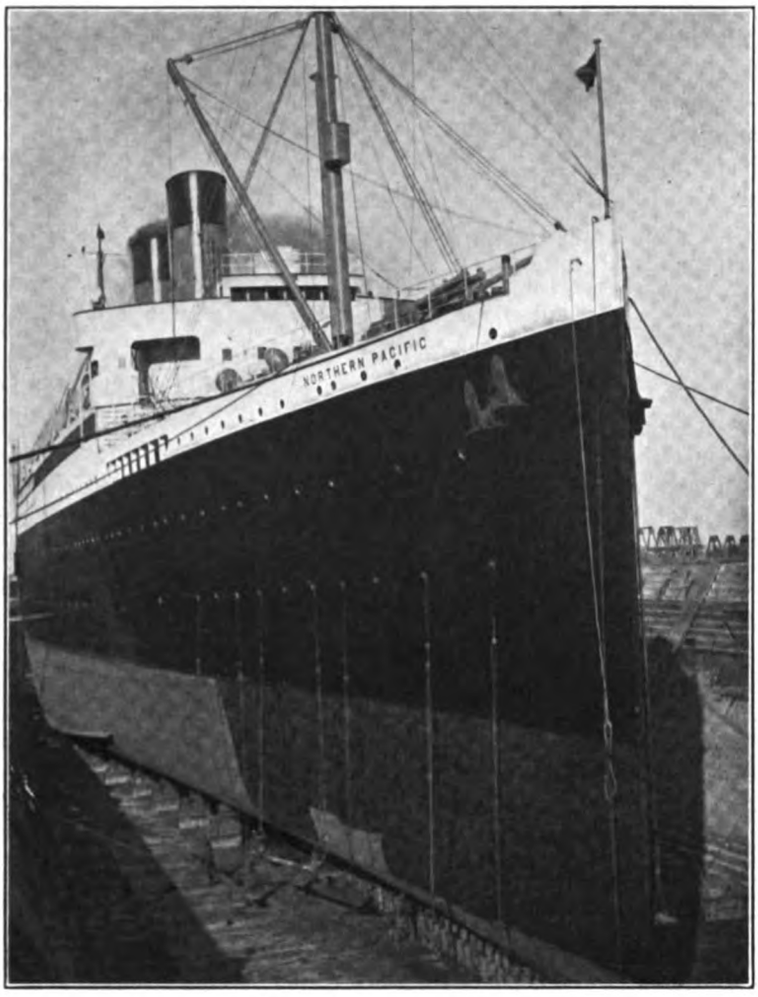
Pacific Mail	$62,258.59
British and Japanese steamers in Pacific	80,530.55

These facts and others akin to them are being compiled for submission to every member of Congress. The conclusions drawn will be these:

It pays in dollars and cents to have American vessels carry the mails.



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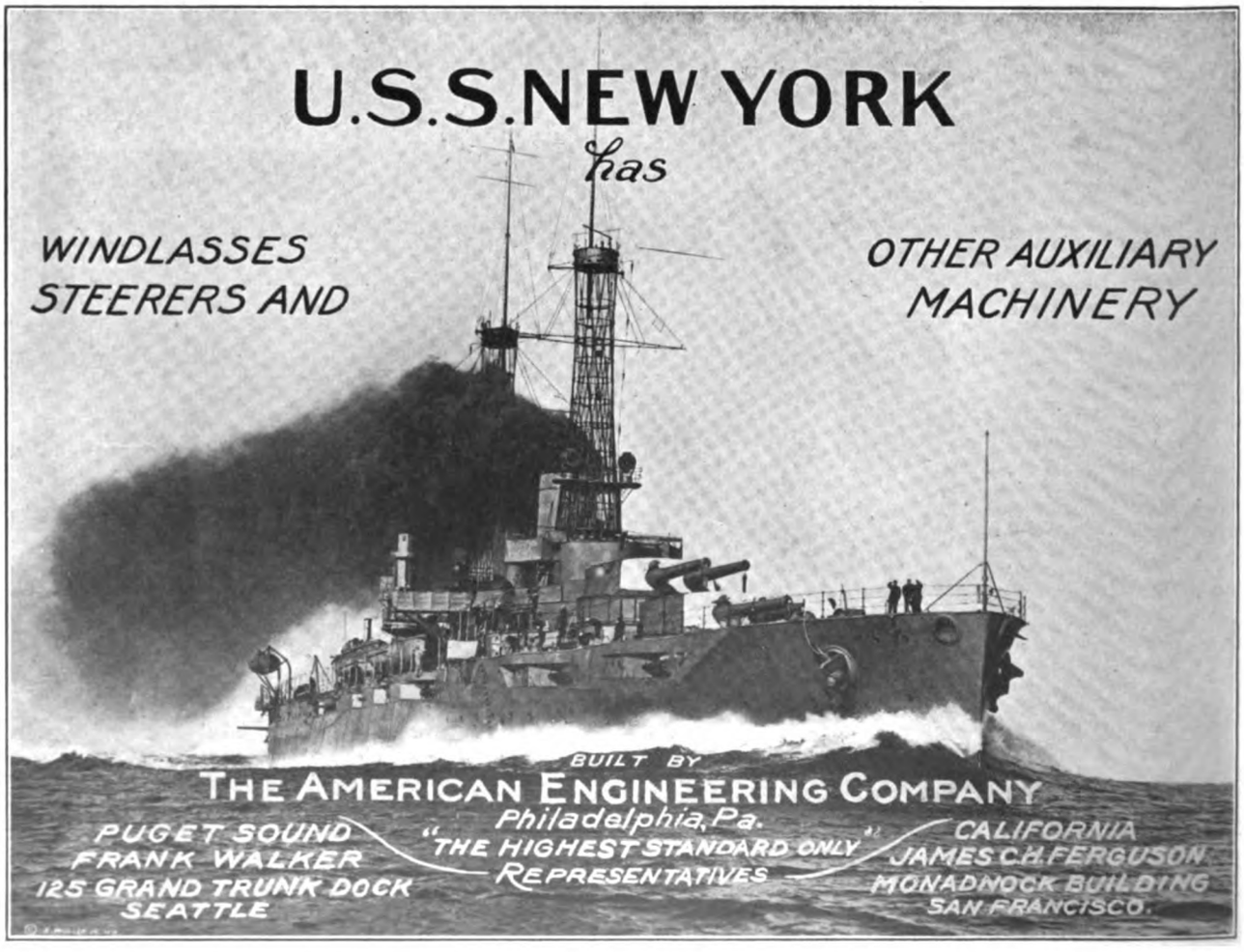


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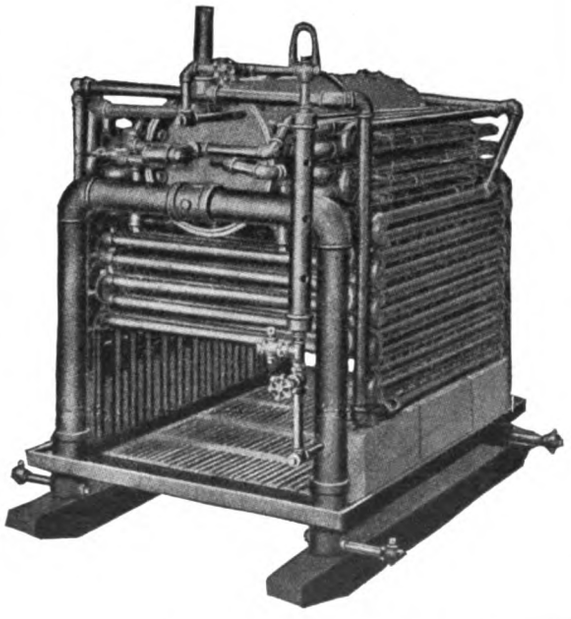
Scientifically arranged heating surfaces

Extreme elasticity

Accessibility

Long lived

Superheated steam



Some Pacific Coast users:

Union Iron Works

S. S. "Chippewa"

S. S. "Iroquois"

Seattle Construction and Drydock Company

Hoquiam Shipyard

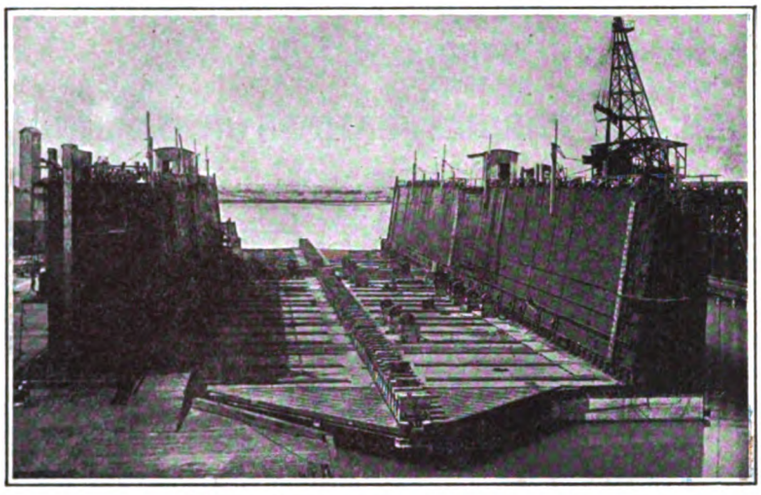
U. S. Revenue Cutter Service

Representatives J. F. DUTHIE & CO., Seattle Shipbuilders

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HONOLULU FLOATING DRY DOCK

INTER-ISLAND STEAM NAVIGATION COMPANY, L'td., Proprietors



FLOATING DRY DOCK "HOOLANA"

Length—

over keel blocks.....352' 0"
over wings .....301' 9"

Width—

over all .....100' 0"
between wings, top.... 84' 0"
between wings, bottom. 76' 0"

Draft—

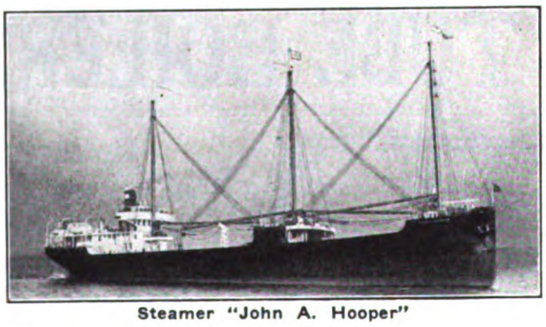
over Keel blocks..... 23' 6"

Lifting capacity .....4500 tons

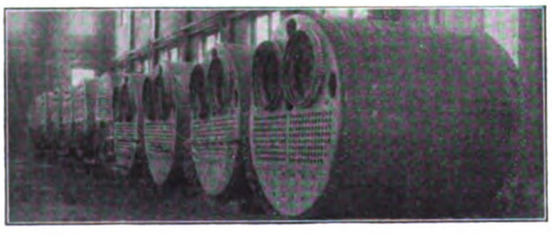
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¶ Compressed Air and Oxyacetylene Apparatus available.
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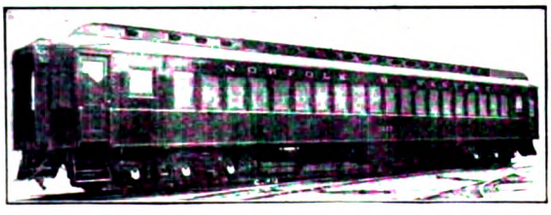
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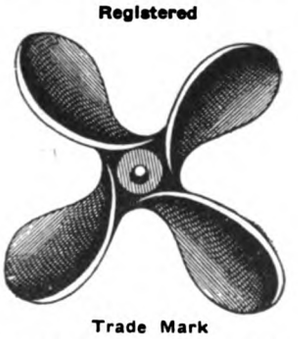
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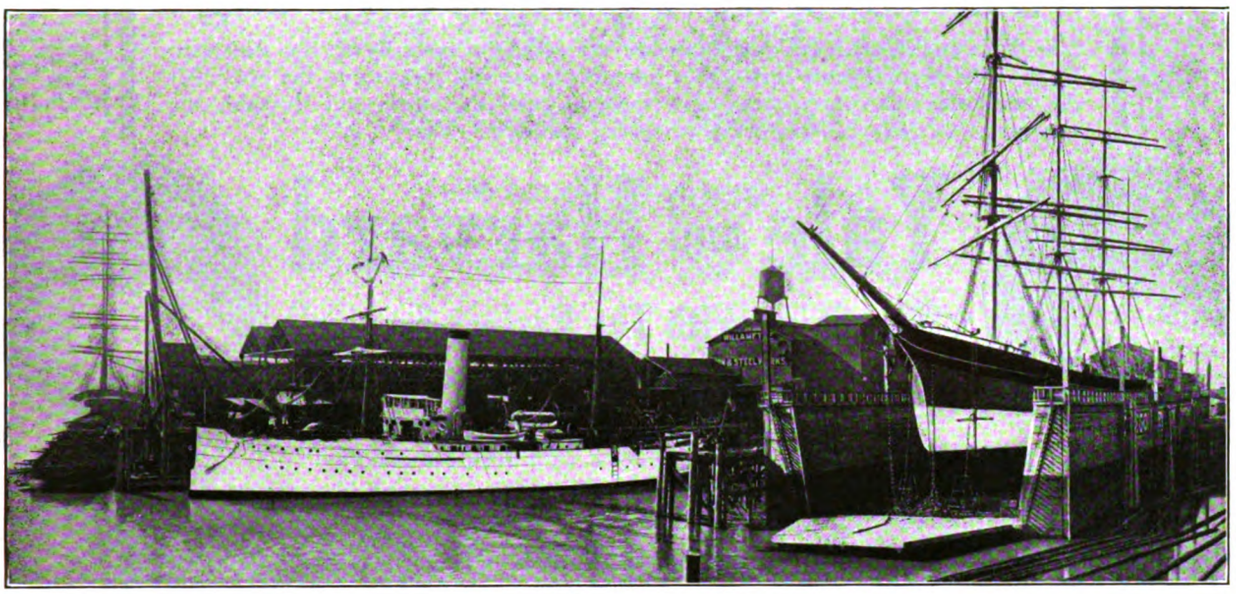
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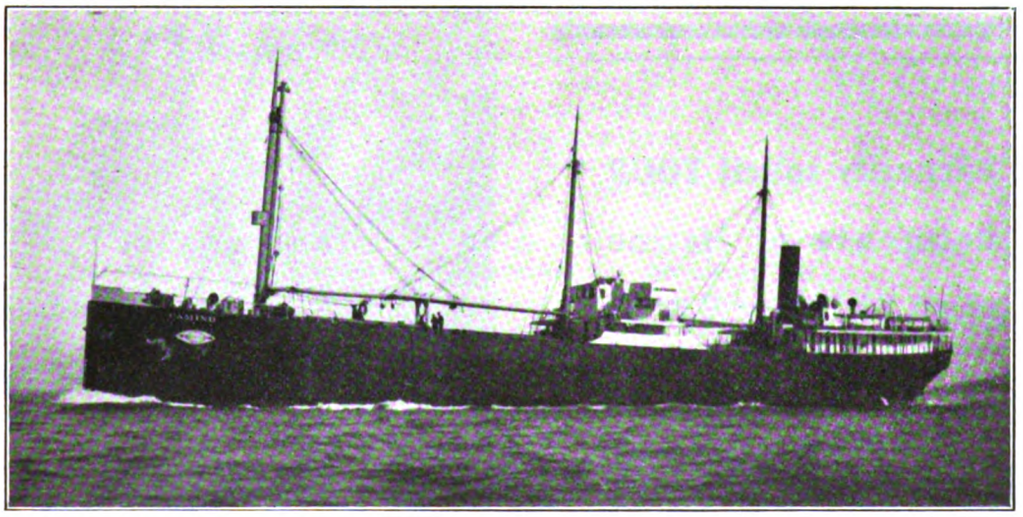
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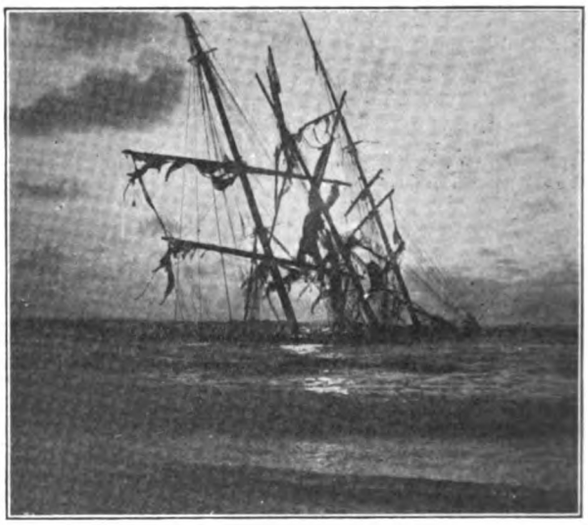
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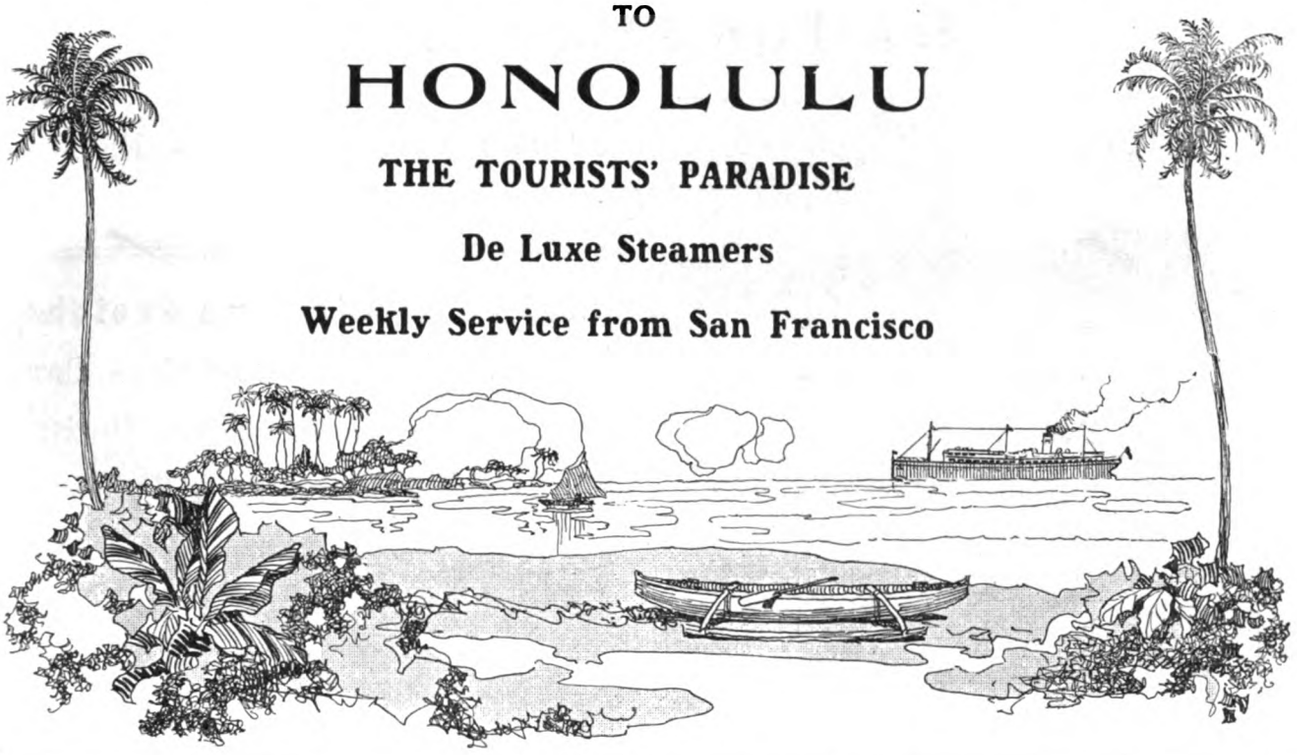
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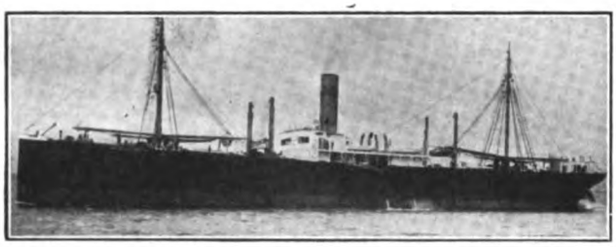
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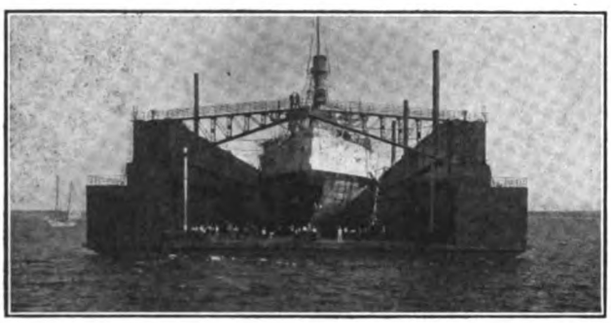
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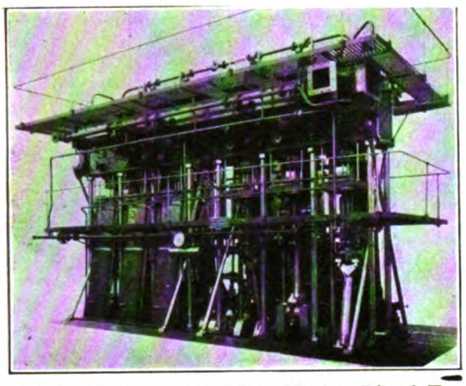
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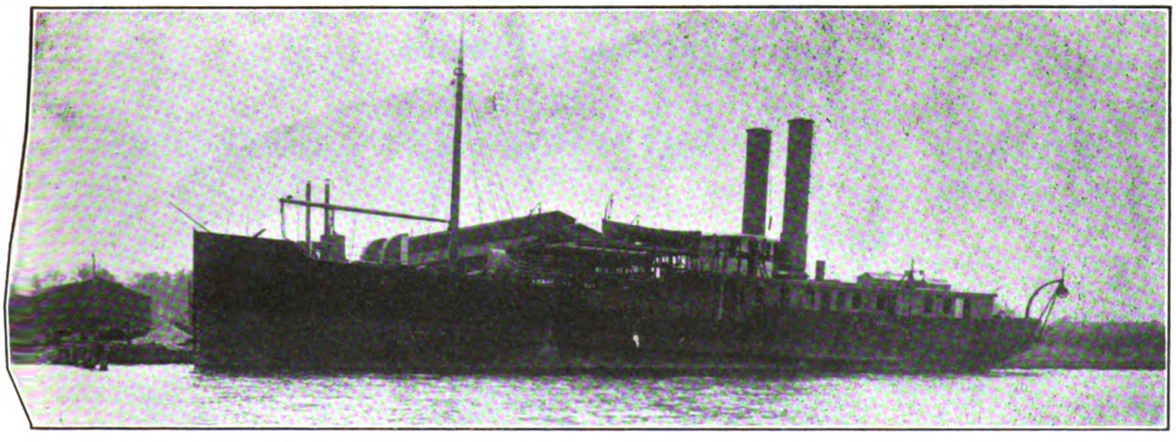
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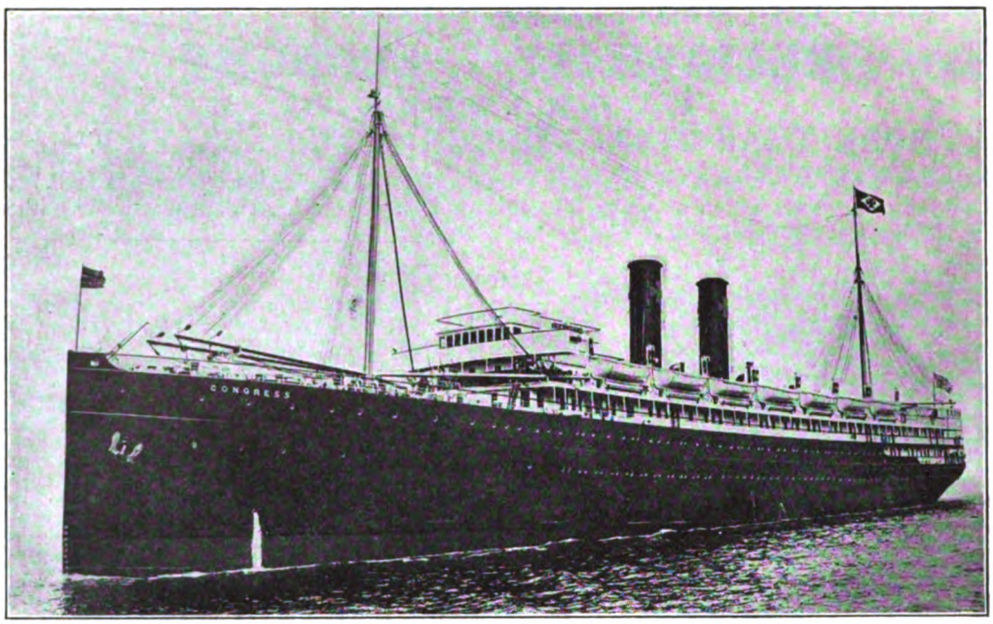
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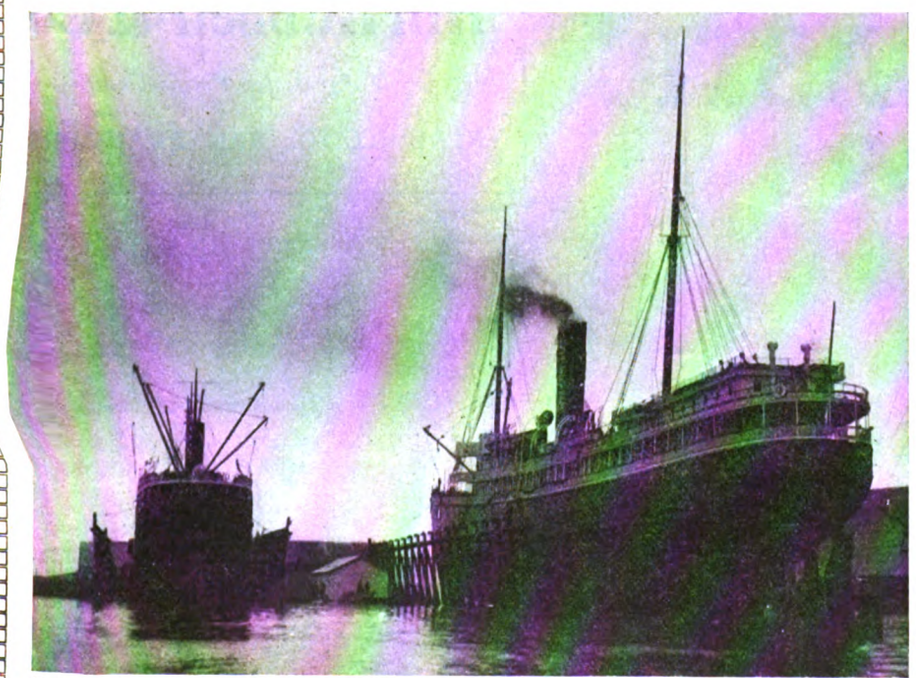
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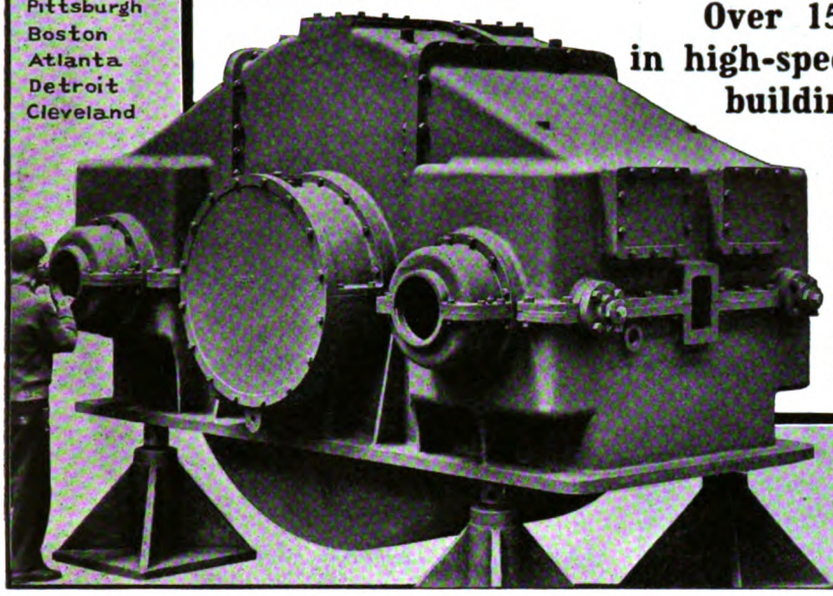
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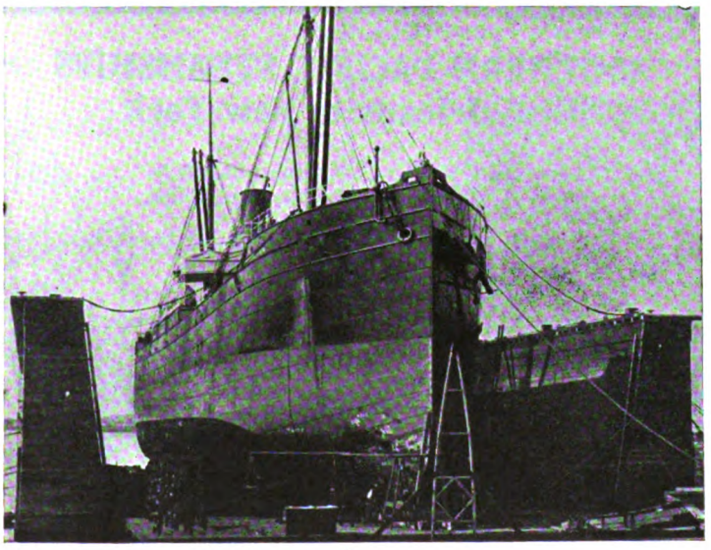


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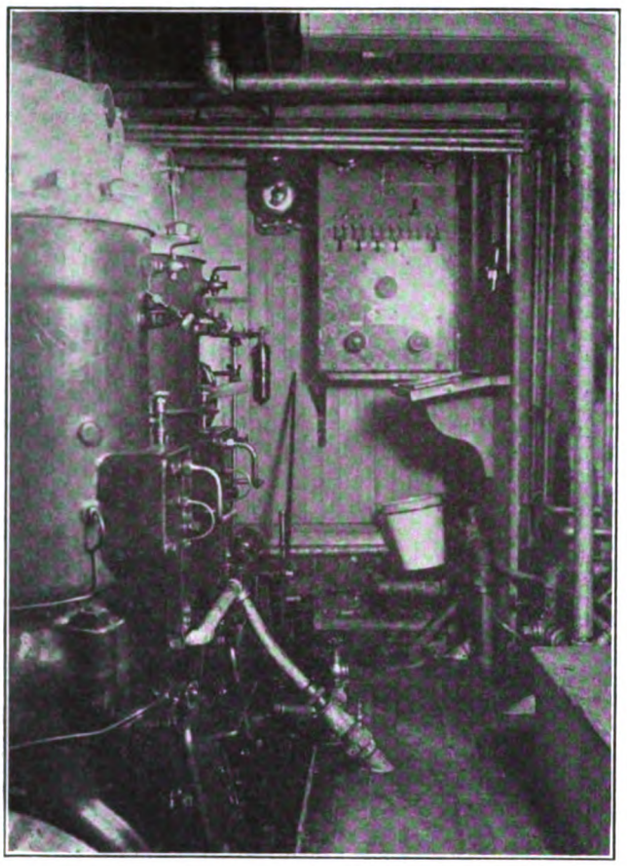
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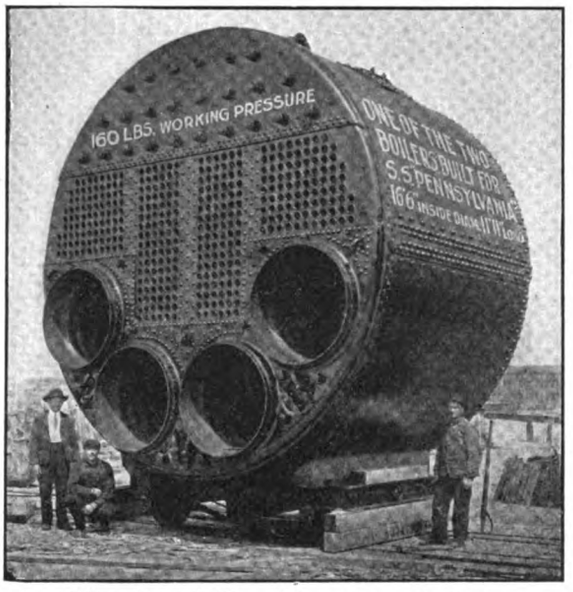
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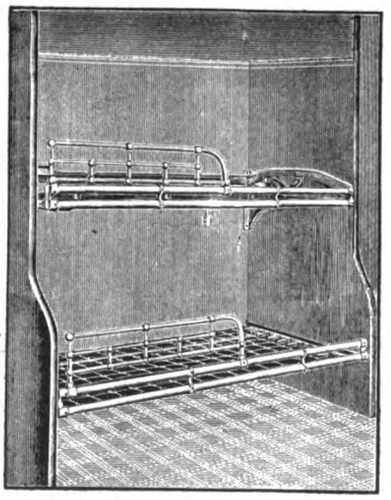
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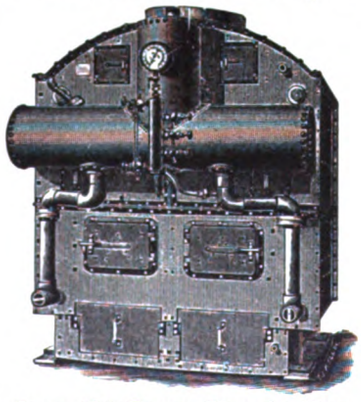
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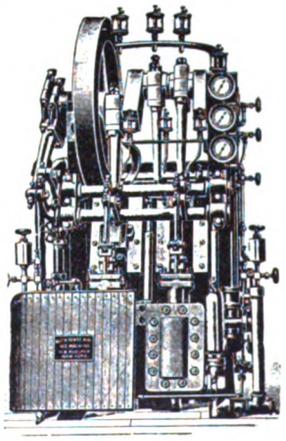
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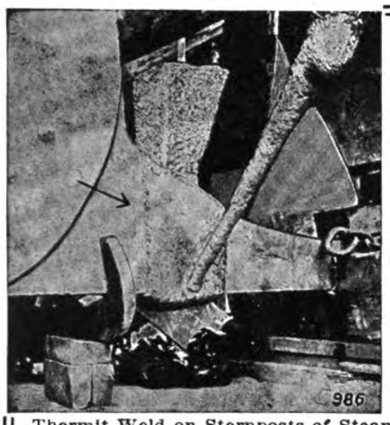
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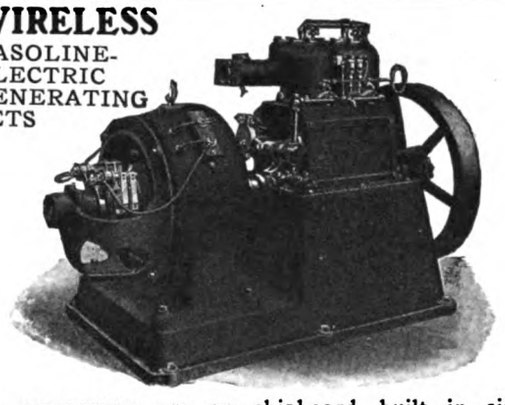
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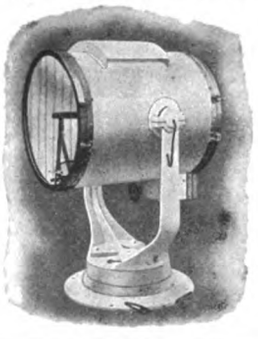
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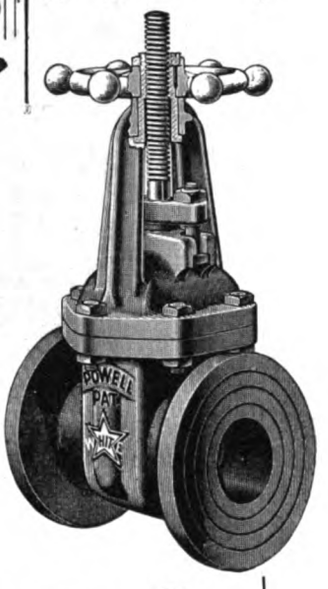
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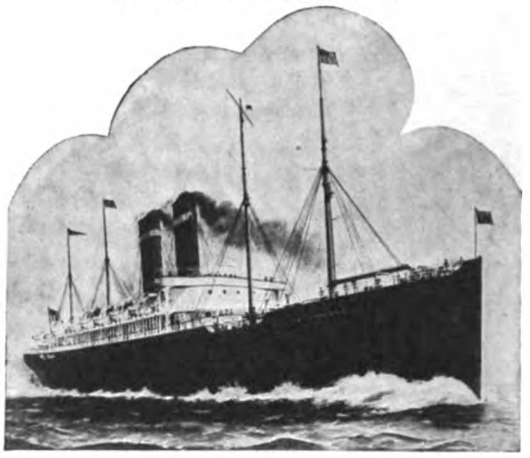
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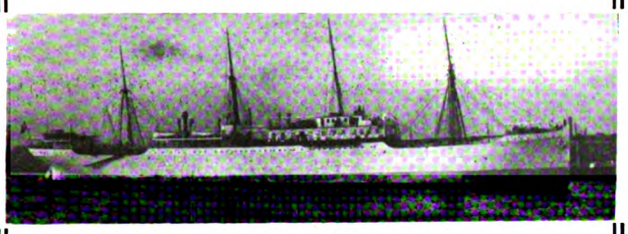
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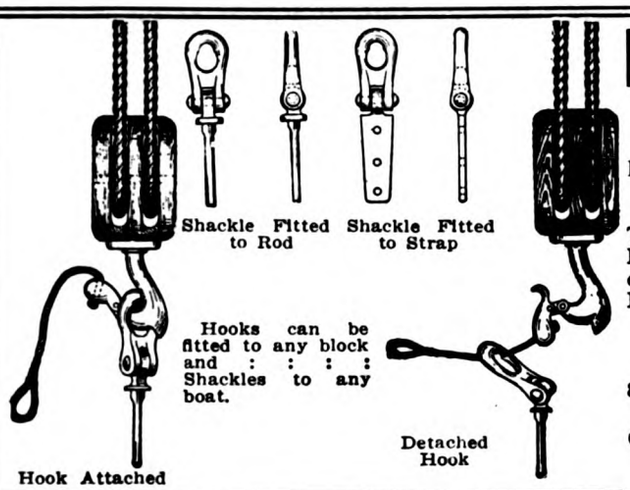
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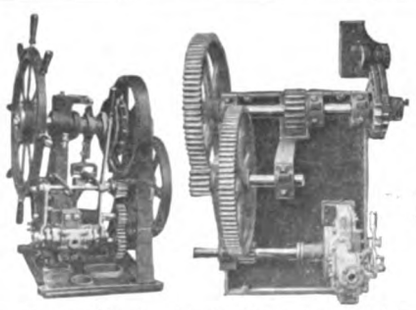
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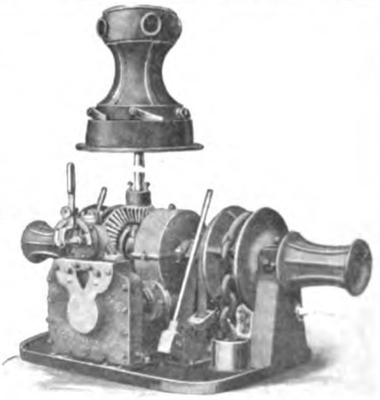
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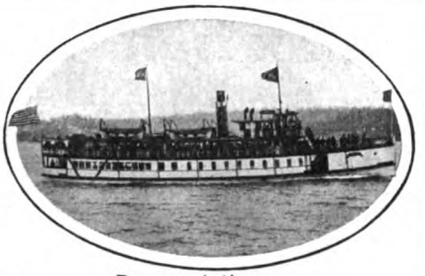


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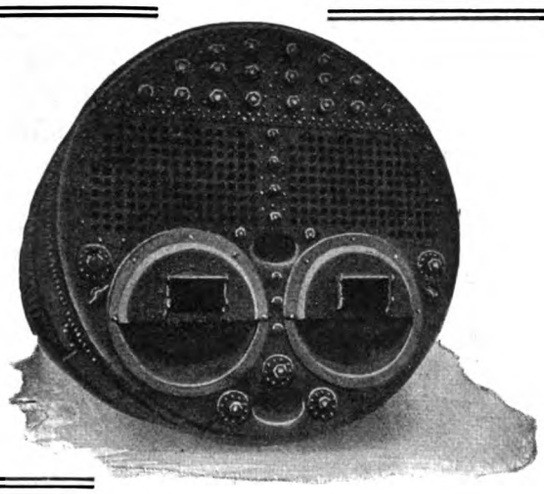
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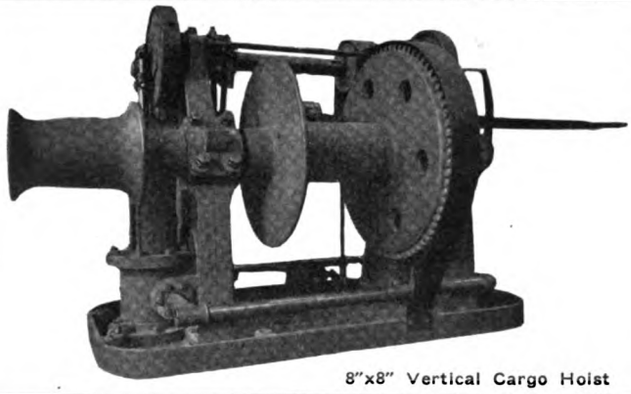


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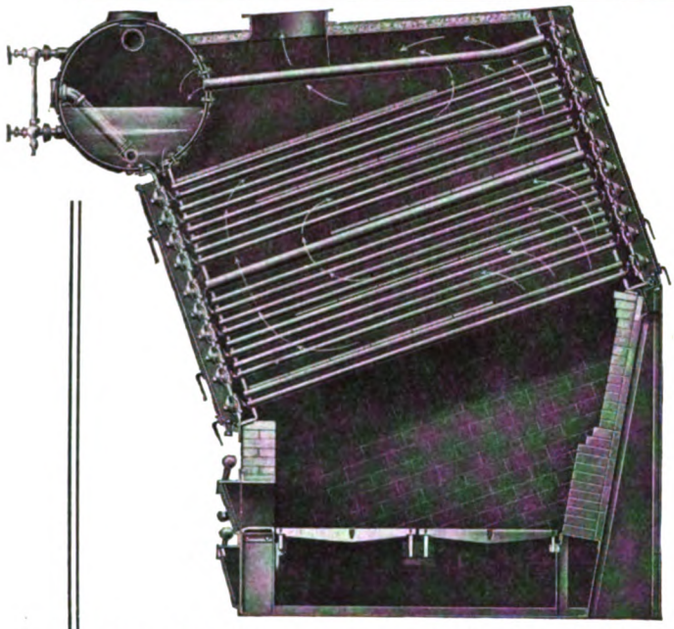
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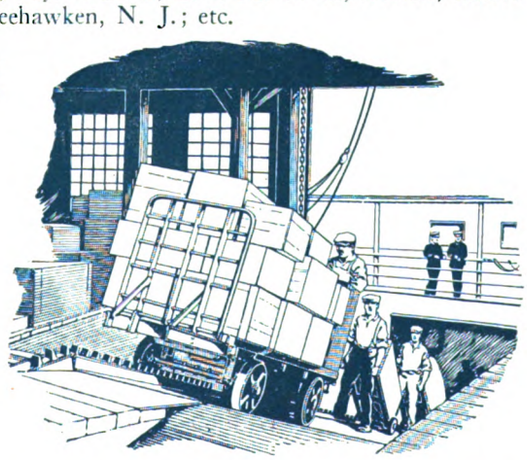
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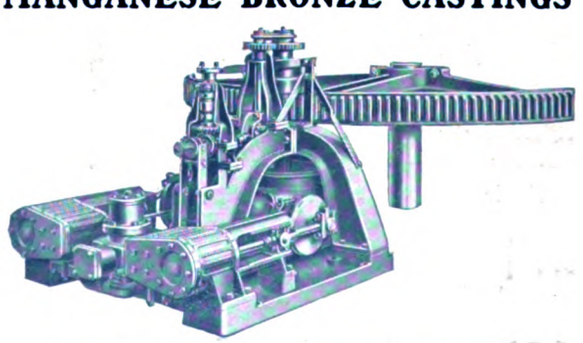
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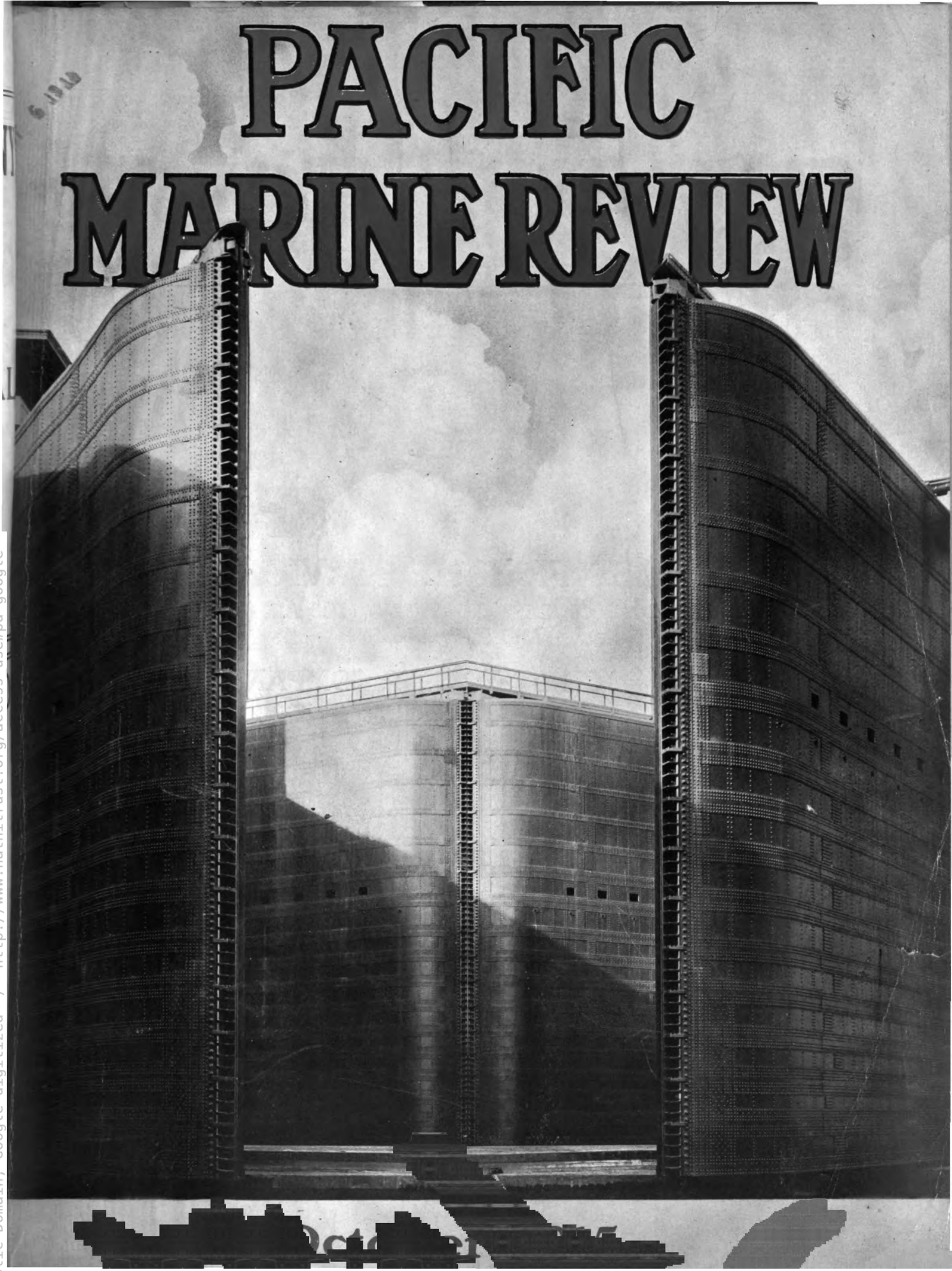
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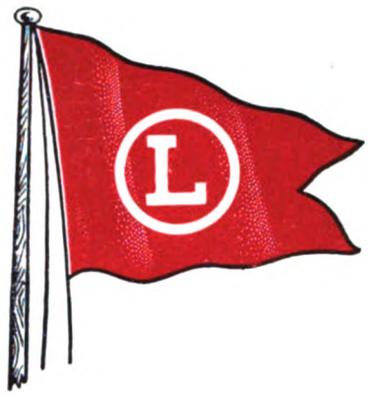
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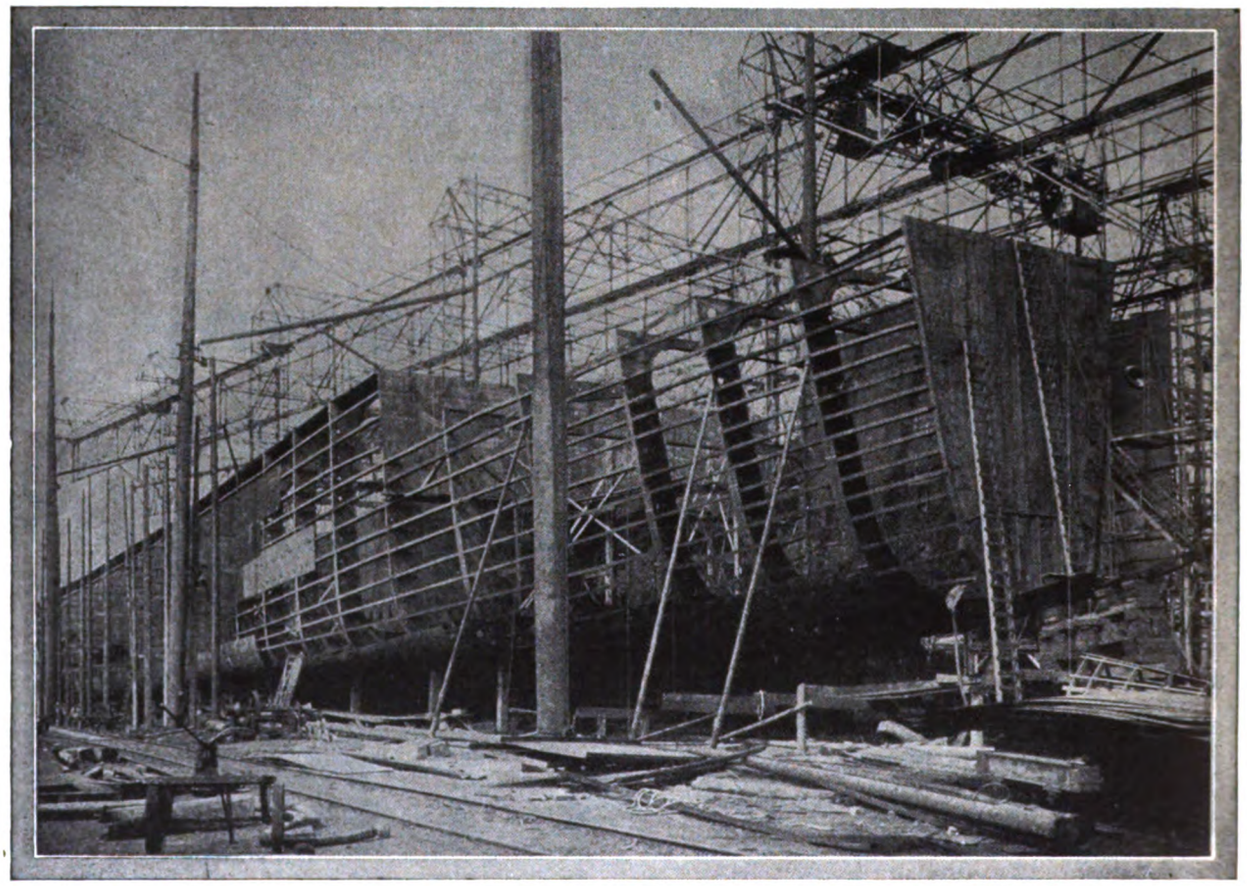
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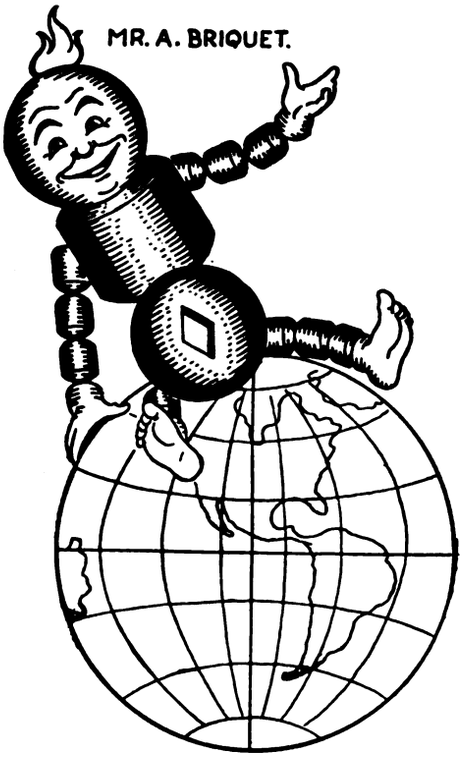
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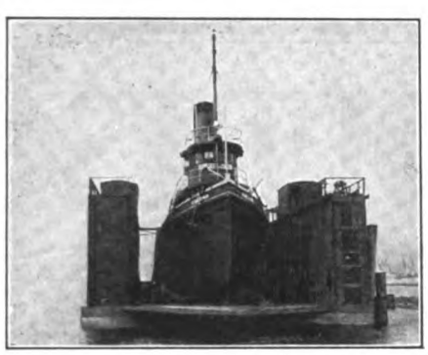
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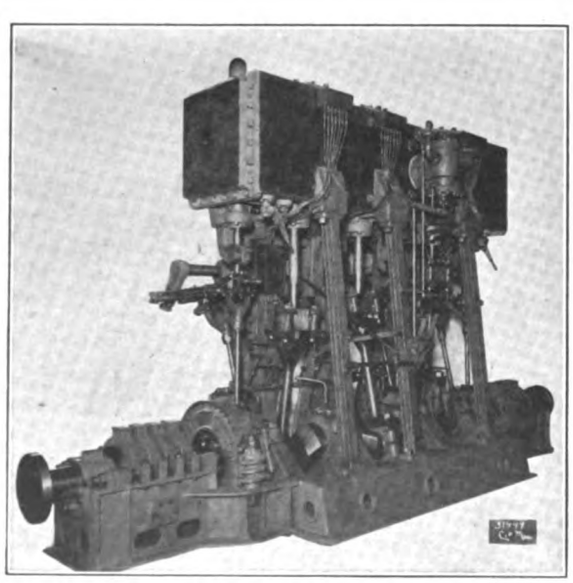
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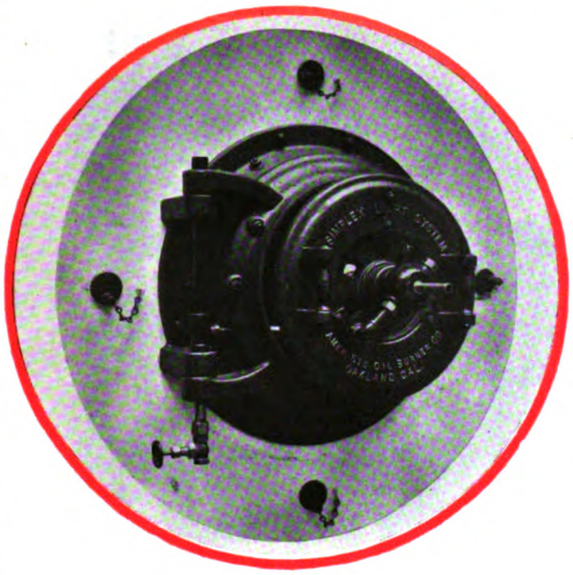
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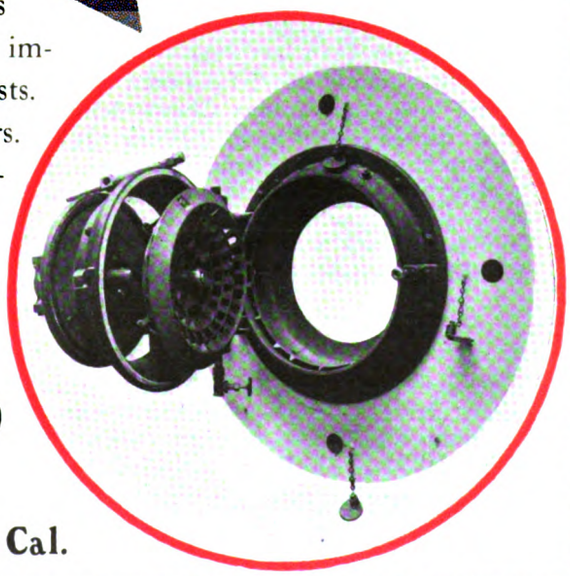
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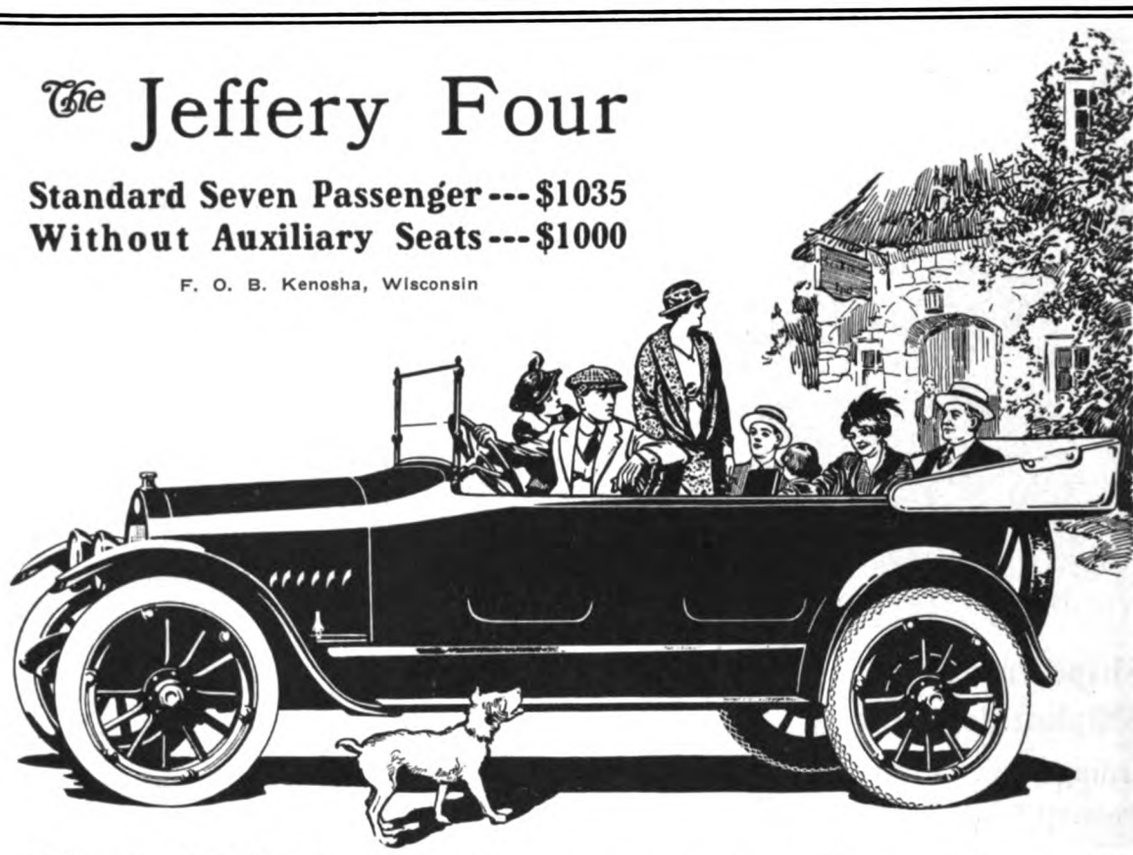
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Standard Seven Passenger---$1035
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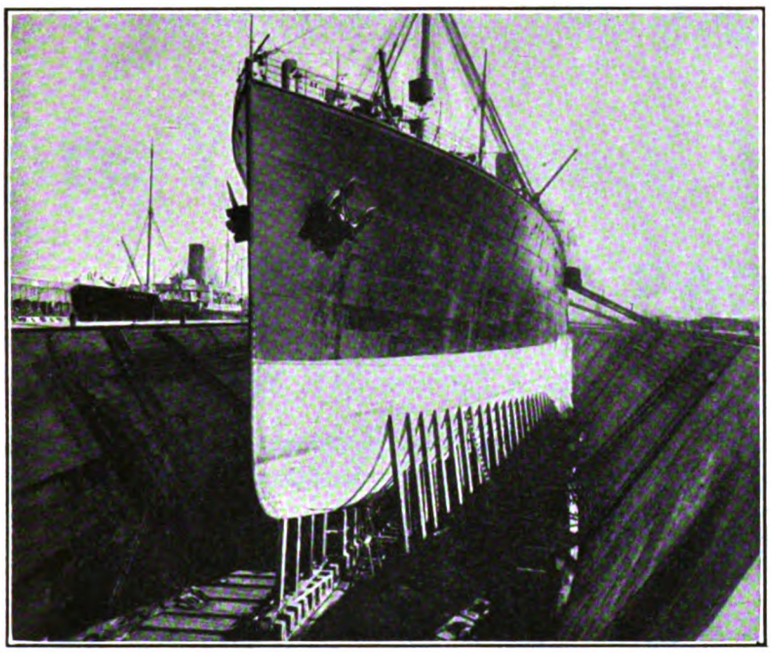
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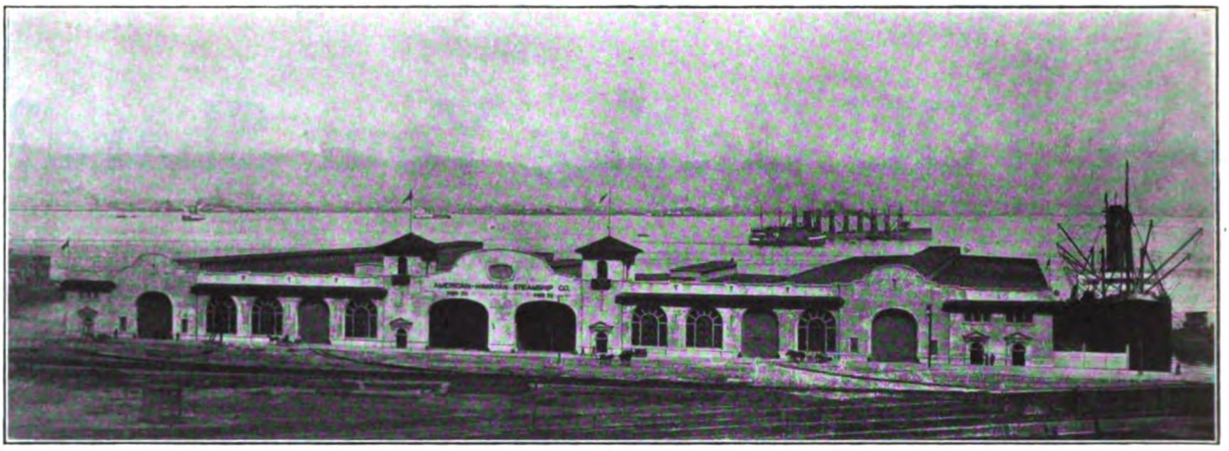
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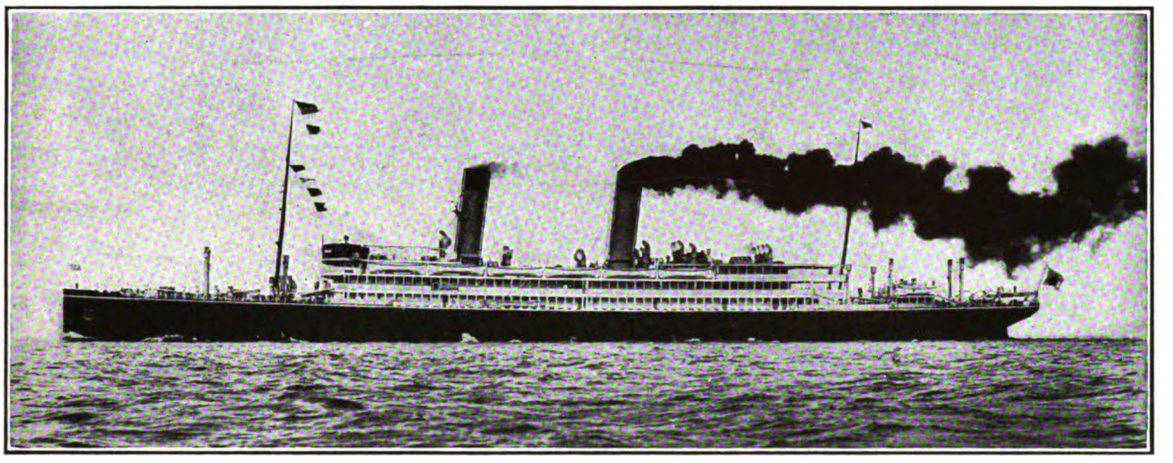
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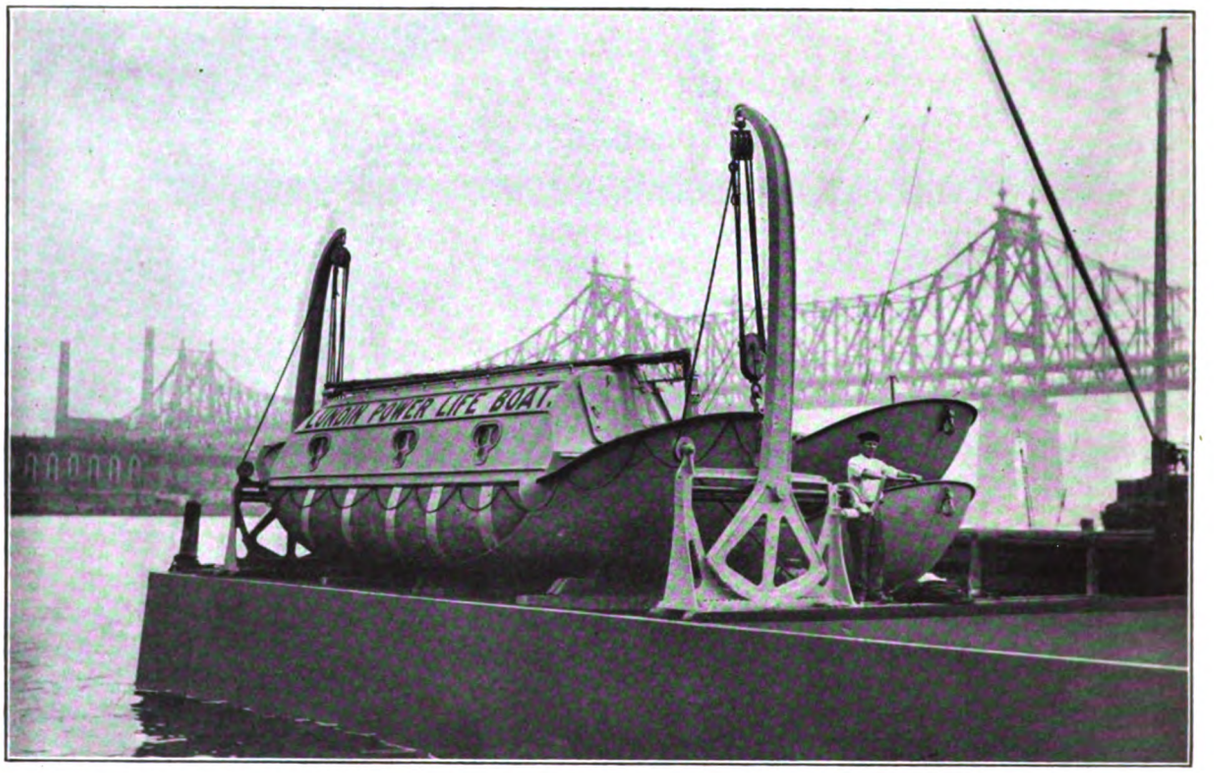
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PACIFIC MARINE REVIEW

LARGEST SHIPPING PAPER PUBLISHED IN THE UNITED STATES.

VOL. XII., No. 10 SAN FRANCISCO OCTOBER, 1915

Why Safety of Life at Sea is Imperiled by the Seamen's Bill

IT IS indeed fortunate that the celebrated Seaman's Act has met with the "pitiless publicity" which the measure deserves. It is difficult to conceive how it could ever have been enacted into a law.

There appears no doubt but that Congress was taken advantage of when the Seamen's Union were fortunate enough to get their remarkable bill safely through that august body.

Psychological conditions at the time were ripe for the Act. With the "Titanic" and "Empress of Ireland" disasters fresh in their memories, and the general public demanding at that time that, under no circumstances, not even such as are supposed to be acts of God, should another life be lost in either fresh or salt water, Congress was ready to hail any measure that offered to placate the public.

Out of this condition emerged the Seaman's Bill as a law; but as an illustration of the shortcomings of the Act the reader may learn from the following:

Under Section 14 of the Seamen's Act is a provision calling for certificated lifeboat-men. These specialists must know how to handle an oar, launch a life-boat, understand orders relative to life-boat service; and they are to be duly installed in life-boats in the following proportions: one life-boat man for twenty-five persons in a boat; two men for forty-one persons; three men for sixty-one persons; four men for eighty-five persons, etc. By having these specialists in the boats, the welfare of seamen and safety of life is presumed to be promoted.

The absurd side to this is, suppose that no other member of the boat's crew could handle an oar except the life-boat men, of what earthly use could be their puny efforts in a crowded boat, even in a smooth sea?

Are not the passengers, and even the other members of the boat's crew, entitled to more protection than this? In fact what right has any man to go to sea for a living if he can not handle an oar to save himself or the passengers in case of an emergency?

Why should not every seaman, before he is allowed to risk his life at sea, be compelled, prior to signing the ship's articles, to produce a certificate showing that he can pull an oar? Would it be a hardship to have to prove that he could at least assist in saving his own life?

The entire crew of a vessel is now compelled by law to be drilled in the launching of life-boats, and, after they are launched, should they, with the exception of a few of their number, become immediately useless through not knowing what every schoolboy should know, how to pull an oar?

There are many elaborate rules provided for the life-boat equipment of a vessel, but of what great good is the equipment if it is inefficiently handled after it is launched from the vessel?

In Australia the law is: "A seaman shall not be permitted to engage in any capacity unless he can pull an oar and handle a boat."

The meaning of the word "seamen," both in Australian and American law, is: "Every person engaged in any capacity aboard a ship, except apprentices."

Why should only a few men of a crew be selected as life-savers? Why not use the entire crew for this purpose? Would it not be for the welfare of the American seamen, and also promote safety at sea, if he learned how to pull an oar?

Setting aside the seamen themselves—the owners of the vessel, the passengers, the relatives and friends

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of every soul on the ship have a right to expect that *every* member of the crew can be of assistance when the necessity arises of taking to the boats.

When an emergency occurs, and the helpless passengers—men, women and children—are huddled on a vessel's decks, watching the crews of the life-boats launching them, will it be any consolation to them to find that, under the Seamen's law, only a few of the crew upon whom they were depending for a chance for life were qualified to handle the boats after they were lowered in the water?

Suppose one or two of these specialized life-boat men were injured or lost, how cheering it would be for the remainder of the boat's crew to explain to the passengers supposedly in their care that, although they are seamen, they are as helpless as the passengers, because they are unable to pull an oar.

Take the case of a life-boat carrying twenty-five people, manned by one special Certificated Life-Boat Man, what provision does the Seaman's law provide for giving that Special Certificated Life-Boat Man a rest from his arduous duties of saving a boat-load of souls, with one oar?

But is there not another side to this feature in the Seaman's bill? Is there not a concealed motive which impelled the framers of the bill to insert in same this apparently valuable provision for Certificated Life-Boat Men? It sounds good to the uninitiated; but does it not really mean another branch of the Seamen's Union to be formed, to exact higher wages? What inducement would a seaman have to qualify as a Life-Boat Man if he is not going to be paid extra for his ability to pull an oar? And as soon as it is established that knowing how to pull an oar means more pay, every man in the crew will learn to pull an oar and demand the extra pay, or refuse to ship. Is it possible that Congress has lent itself to assist the Seaman's Union to add this additional burden on the vessel? Is it possible that a restriction has unwittingly been placed by Congress upon safety of life at sea for the benefit of the Seamen's Union?

Does not common sense, and the safety of life at sea, demand that the provision for Certificated Life-Boat Men be stricken from the bill entirely, and that, instead of only a few men of the crew, the *entire* crew shall be qualified as life-savers? They all receive training, under existing laws, on board of their vessel in the launching of life-boats at sea, and their education and value as life-savers would be practically completed if they all knew how to handle an oar. Therefore, amend the law by striking out the provision for Certificated Life-Boat Men, and insert the following:

"A Seaman shall not be permitted to engage in any capacity unless he can pull an oar."

How One Sailor Looks at the Question

SOME weeks ago what purported to be a public debate on the Seamen's Bill was staged by Mr. Andrew Furuseth and Mr. Walter Macarthur. The opponents of the measure were to have been, according to program, represented by Mr. R. P. Schwerin and Mr. Robert Dollar. As both of these gentlemen wisely declined to take any part in such a plausible frame-up, the promised debate did not materialize and the audience which gathered probably went away thoroughly convinced of the righteousness of the Seamen's Act.

It would appear, however, that the wool was not completely pulled over the eyes of everyone present, as will be seen by the following account of the meeting from the pen of a man who signs himself "A Sailor," and whose letter proves that he is not only a sailor but also a close student of present day economic conditions. We do not agree with all the conclusions our sailor friend reaches, but the letter is plainly one of frank and honest convictions, and moreover is highly interesting, and it gives us pleasure to reproduce it here in full:

San Francisco, Sept. 18, 1915.

The Editor, PACIFIC MARINE REVIEW:

The other evening I went to hear Mr. A. Furuseth tell the public what he termed the true facts concerning the Seamen's Relief Bill, about which there is so much discussion at present; but, beyond a flow of rhetoric, I heard very little of any great importance any different from what has already been given to the public in most of the daily papers throughout the country, but which Mr. Furuseth would have his hearers believe the press has never published. Of course, it suits his purpose to make such statements, because it creates an impression among his hearers that he is very much abused and thus arouses their sympathy, and once this is gained his audience is willing to swallow and believe everything he says. This is the secret of the success of the popular public orator.

First of all we listened to the chairman of the evening, Mr. Rudolph Spreckels. He told us that we would first hear from the Commissioner of Shipping, a Mr. Macarthur, and that he would give us some figures and statistics on the growth of our American Merchant Marine which would be surprising and which, Mr. Spreckels said, had astounded him when

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given to him by this gentleman. Evidently Mr. Spreckels does not read the shipping news very much, because if he had he would have seen that these figures, or figures approximating them very closely, had appeared in several papers. The Commissioner, after rolling off these figures, which he told us was astounding, and probably was to the major portion of the audience, who knew nothing of marine matters pertaining to tonnage, etc., and care less and who wouldn't know the marine page of a newspaper from the real estate section. To most of these no doubt the figures, as rolled off, seemed large, but are they as large as they ought to be under the existing conditions? I say no, they are not. They should be twice, aye, three times as large.

Again the Commissioner rolls off the immense amount of profit some of these companies are making, naming one company especially, and it did sound mighty large. But did he mention the amount of capital that was invested in this company and what percentage this was on the capital invested? Or did he mention that owing to the war freight rates were enormously out of proportion and profits excessive in consequence? Oh, no, that would spoil his argument. When one makes a profit of $100 a year on a $1000 investment it does not seem very much, but increase that investment a hundred fold and the profit accordingly and it immediately appears immense, yet the proportion is the same and as you increase your holdings so your expenses also increase, and as the stockholders of such a concern are many, when this profit is distributed among them the individual share in not so much, though in one lump sum it looks tremendously large.

The poor Commissioner seemed to be in doubt as to whether any paper would publish his figures, but I would say of him as of Mr. Spreckels, he can't read the Government reports, as given in the shipping papers, or he would have seen that the figures he was giving out was stale news, at least to some of his audience. Let us hope that he will rest easier when he knows that these figures have already been published and that he will hereafter pay more attention to the shipping reports and less to the editorial page, which he seems to study a good deal, judging from his remarks. It might cheer his heart if some of the papers would mention his name, as he seemed anxious to have it printed.

After the Commissioner got through with his adding machine, Mr. Spreckels again took the floor to introduce the speaker of the evening, Mr. Furuseth, but before doing so he turned a very neat trick, which showed the spirit of the born public speaker or chairman, that of requesting another man to speak, who is not in the audience or not on the platform, knowing very well that even if the party was present he is at a disadvantage and would get scant attention, if any at all. But this little bit of gallery play gains the applause of the audience and their sympathy and attention is given to the next speaker.

Mr. Furuseth was then introduced and outlined the Seamen's Bill to his audience, just as it has been outlined in all publications all over the country. He would have us believe that the sailor is treated as a slave, which is far from true and is not borne out by facts. He states that the wages of a sailor is not sufficient to maintain a family on, which is wrong, as many a man on shore maintains a family on far less. The fact is, the sailor is a natural spendthrift and as his money is easily earned the old saying of "Easy come, easy go" applies to him as to all others.

If Mr. Furuseth is so anxious to raise the wages of his fellow countrymen, in Sweden or Norway or wherever he comes from, to the American standard let him go over there and start the agitation, for that is what this amounts to. He is using the American nation and our merchant marine as a club to raise the wages of sailors of the different European nations, and our merchant marine is suffering in consequence. The stumbling block in his way, however, is the Japanese and maybe, in a few years, probably the Chinese as well.

However, Mr. Furuseth said he would tell us how we could obviate that and put them on the same level as the others. After waiting patiently for the solution of this problem that the Japanese sailor, being as equally avaricious and unconscionable as the average European sailor, judging them from Mr. Furuseth's standard, would desert his ship and demand the wages of the port before he would return to his vessel.

Here Mr. Furuseth shows some ignorance of our immigration laws concerning Orientals, or ignores them to deceive his hearers, for both Japanese and Chinese are forbidden to land here except under bond. Again the Japanese, even if he dared desert his vessel and extort higher wages before returning, would be severely dealt with by his government on his return. But outside of the facts the Jap knows on which side his bread is buttered and he is a patriot first, last and all the time.

Again, Mr. Furuseth told us very cunningly how much the Japanese crews were paid in comparison to the Pacific Mail. He did not state, however, that the Pacific Mail carried a much larger crew than a Japanese vessel, or that the American officers were much higher paid than the Japanese officers, so that the wages account of the American vessel was practically one-fourth to one-third greater than the other. Oh, no, he blandly explained that the success of the Japanese vessels was due to an economic condition. To put it plainly, this economic condition is a subsidy paid these vessels by the Japanese government.

Again, Mr. Furuseth said that there were three things which American shipowners claimed militated

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against them. First was that the foreign competitor could build his vessel for one-third less than he could, which is quite correct. Second that our measurement rules were not right and gave the foreigner the advantage. This also is correct. Third was the higher wages paid the crew. Right again, but only in a minor degree. Mr. Furuseth dealt only with the wage problem, yet that is the least of all and taken as a body, the American shipowners have rarely objected to paying the highest possible wages to the crews of their vessels.

As the Seamen's law and the wage problem is the only thing under discussion, we will not mention the other two problems except to say that both are very important and should be remedied. I will not trespass much further on your valuable space except to state that though I do not agree with Mr. Furuseth in all matters, yet there are some good things about the Seamen's Relief Bill; but as Mr. Furuseth did not mention them I will not deprive him of the pleasure of enlightening his hearers at some future date. What this country needs, if we are ever to become a factor in the merchant marine navies of the world, is ships, ships and still ships, but where are we going to get them? Now is the time we ought to be interesting ourselves in the foreign trade, whilst we have the advantage, but are we doing it? No, we are bickering over the Seamen's law. Private capital afraid of it has not come to the front and our legislators killed our only hope of securing an out and out American merchant marine which will remain with us after the war by voting down the Government Ship Purchase Bill, which would have helped to relieve the situation somewhat. Let us hope that the general public will give its support to this measure when it next comes up and demand its passage. Yours for bona fide American merchant marine which will make our nation independent of all others in the ocean-carrying trade in times of peace and be the backbone of our Navy in times of stress. For where are we going to get seasoned men to man our warships should they be needed, if we do not have a merchant navy to breed them in in times of peace. Sailors are not made in a day or in a year for that matter, notwithstanding Mr. Furuseth's views to the contrary, who seems to think that because a man has spent three years at sea swabbing paint and chipping iron rust (which is about all the average man does on board a steamer) as soon as this man joins the Seamen's Union he becomes automatically possessed of all the qualities of a sailor. God help us from such, should occasion arise to depend on them. If left to themselves they wouldn't know how to pass a ball of spun yarn to a man serving a splice, far less swing a boat out with the ship at an angle of 30 to 40 degrees. The old adage "In union there is strength, divided we fall" applies to them only too literally, for without their Union such men wouldn't be worth carrying, even as ballast.

If Mr. Furuseth, Rudolph Spreckels, with his millions which give him a power to do good, and the others who are so anxious to do something for the sailor, they will find lots to do on shore to better his condition, which is infinitely far worse than his surroundings on board ship. Take for example the Sailors' Home in San Francisco. Anything more forlorn and dilapidated it would be hard to find anywhere, standing as it does on a crumbling sand dune it is typical of the stage our merchant marine is in to-day.

If these promoters of the seaman's welfare have really the interest of the sailor at heart, instead of posing in the limelight, let them get to work right here, tear this building down and build a modern building, fashioned after some of the modern Y. M. C. A. buildings; but build it where it can be seen and reached, somewhere within civilization. Don't stick it away off out of sight among warehouses and railroad yards, as if the sailor was a "Pariah" and not fit to live among other humans.

Contrast this with his condition aboard ship, where he at least is treated as a man among his shipmates, and do not wonder if he seeks solace from his loneliness on shore, with a shot in his locker.

Here is work for you to do, Mr. Spreckels, which will make your name honored wherever sailors congregate and gain the antipathy of no one.

Sincerely yours, A SAILOR.

The Pacific Marine Review,
San Francisco, Calif.

Gentlemen:—

In reply to your communication of July 15th, I am pleased to give the following as to the effect the Seamen's Bill will have on the Great Lakes:

First. The bill is purely a union labor measure and its effect is to tie the United States Government up to union laborism. The promotion of safety at sea, abolishing of involuntary servitude, etc., are merely popular appeals made to the public as a means of greasing the ways for the sliding through of the union labor features of the bill. The provisions of the bill requiring such large percentage of lifeboats and rafts and specifying certificated or able-bodied seamen to be in charge thereof who must be examined and licensed by the United States Government, puts them in the situation that when they want to go on a strike the Government must uphold their hands in it, because, by the provisions of this law nobody else can take their places. Is it good policy for this Government to thus hand its power over to union laborism? Suppose, for instance, that this country was engaged in a war and wanted to send coal by colliers to its ships engaged in duty on some coast where fuel had to be delivered to them by colliers. These colliers, if we are ever

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fortunate to have any, would necessarily be manned by these licensed seamen and boatmen. If they wanted to go on a strike at such a juncture, the Government would be absolutely helpless, and there is certainly no assurance that they would not choose such a time to go on a strike, as the experience of England with the coal miners, and our own experience with strikers in the ammunition plants demonstrate.

Second. So far as our Great Lakes are concerned, the attempt to load down steamers with lifeboats and able seamen is unnecessary, so far as safety is concerned, and is impossible when considered from a commercial standpoint. Most of our steamers are of a special type of construction, carrying large numbers only during the warm weather or excursion season, on short runs and at cheap rates. These boats are very seldom out of sight of land, usually in shoal water where they would not be submerged; indeed, are usually within a few minutes' run from land and passing other ships every few minutes. It is very seldom that lifeboats could ever be used and all people most experienced in the business are of the opinion that liferafts and lifebelts, which are easily handled, would be much more serviceable for a large crowd of people than a large number of heavy lifeboats. The water is always warm and help within a very short distance.

From the commercial standpoint, the equipping of these boats with sufficient lifeboats to continue their operation commercially would be impossible. They cannot carry very many more metallic lifeboats and the result is that their passenger-carrying capacity must be cut down to meet the number of lifeboats they can carry. This, therefore, means an increased expense in equipment and operation when the additional seamen are taken into consideration, at a reduced revenue because of the cutting down of the carrying capacity, and the carrying capacity will be so cut down that the operation of the boats could not meet operating expenses. Raising the fares is not practicable, because all of these lines have along-shore competition with electric and steam railroads.

Third. The three-watch system would work out as not only a hardship, but an utter futility in a great many of the passenger boat runs. The routes are short, the cities being close together, and a great many of the boats have only four, five or six hours of a run each night or day; so that at the present time, with the two-watch system, the watches are only really working outside while the boat is navigating for three, four or six hours out of the twenty-four. If another watch were put on, one of the three watches necessarily would only stand a watch while the boat was lying at the dock where there is practically nothing to be done.

Respectfully,

DETROIT & CLEVELAND NAVIGATION COMPANY,
A. A. SCHANTZ, V. P. & G. M.

AMERICAN EFFICIENCY DEMONSTRATED.

HOW the notable achievement of building ten submarines on the American side of the Atlantic and delivering them to the Allies was carried out recently leaked out and the facts of the case speak highly for American thoroughness, ability and speed.

In just five months from the time that Charles M. Schwab, of the Bethlehem Steel Company, received a contract from the British Government, ten of the submarines were turned over to British crews at the Vickers-Maxim yards in Montreal, where they were built jointly by the Bethlehem Steel Company and the Electric Boat Company.

All records in submarine construction were surpassed by this feat. Within two weeks after leaving Montreal, five of the submarines were on duty in the North Sea, and within twenty days after leaving the other five had reported at the Dardanelles.

Perhaps the most surprising thing about this feat is the fact that none of the boats underwent any exhaustive trials before setting out on its journey across the Atlantic. The new English crews had but a day or two to familiarize themselves with the differences that exist between the English and American type of an underwater craft, and yet it is evident that the long voyages were made without mishap, the ten boats starting together and reporting at Gibraltar within an hour or two of each other. The craft were a standard type of about 140 feet in length and fitted with heavy Diesel engines built by the New London Ship and Engine Company. Each submarine has four torpedo tubes and probably storage for about eight torpedoes.

Having secured a contract for submarines, Mr. Schwab started to build them at the Fore River Shipbuilding Corporation, but the State Department ruled that a submarine could not be delivered to any belligerent power, and ten vessels now completed must wait in this country until the close of the war. Determined to carry through his contract, he made arrangements with the Canadian yard. Considering that two firms collaborated on these submarines and that they were built in the strange yard of a third firm, the, as far as is known, flawless performance of these small and delicately adjusted underwater craft is a remarkable tribute to the work of the firms undertaking their construction.

The splendid results with this submarine contract is especially interesting to the Pacific Coast, since Mr. J. J. Tynan, vice-president of the Union Iron Works, was picked by Mr. Schwab to oversee the construction of the submarine hulls at Montreal.

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International Engineering Congress, 1915

THE International Engineering Congress at San Francisco which has just closed brought together a remarkable gathering of engineers despite the fact that war conditions in Europe prevented many eminent men who had fully expected to be present from attending. The sessions on Naval Architecture and Marine Engineering were naturally more interesting to this magazine than the others and reviews of some of the papers presented are found on the following pages. The full list of papers read before this section of the Congress is as follows:

"Ship Calculation Resistance and Propulsion," by D. W. Taylor, Navy Department, Washington; "Ocean Freighters," by Ernest H. Rigg, Naval Architect, New York Shipbuilding Company; "Recent Developments in Japanese Shipbuilding," by Dr. E. Terano, Prof. of Naval Architecture, Tokyo Imperial University; "Bulk Freight Vessels of the Great Lakes," by Herbert C. Sadler, Professor of Naval Architecture, University of Michigan; "River, Lake, Bay and Sound Steamers of the United States," by Andrew Fletcher; "Special Types of Cargo Steamers for the United States Coast-to-Coast Trade Through the Panama Canal," by George W. Dickie; "The Development of the Sail Yacht, Steam Yacht and Motor Yacht in American Waters," by William Gardner; "The Lightship," by G. C. Cook, Government Light House Service; "Warships of the First Line of Battle," by Colonel E. Ferretti, Naples, Italy; "The Submarine," by R. H. M. Robinson, Managing Director, Lake Torpedo Boat Company; "Present Conditions of the Submarine," by Max A. Laubeuf, Late Chief Constructor of the French Navy; "Modern Marine Gun Armament," by Lieutenant H. F. Leary, U. S. N.; "General Problems of Naval Warfare," by Lieutenant Commander D. W. Knox, U. S. N.; "Marine Boilers and Boiler Room Equipment," by Charles F. Bailey of the Newport News Shipbuilding and Dry Dock Company; "The Development of the Marine Steam Turbine," by Lieutenant Commander H. C. Dinger, U. S. N.; "The Application of the Steam Turbine to Marine Propulsion," by J. F. Metten, Chief Engineer, Wm. Cramp and Sons' Ship and Engine Building Company; "Recent Development in Marine Engineering in Japan," by Dr. M. Tsutsumi, Chief Engineering Surveyor, Japanese Mercantile Marine Bureau; "Coaling Plants and Floating Cranes of the Panama Canal," by F. H. Cooke, Civil Engineer, U. S. N.; "Cargo Handling Methods and Appliances," by H. McL. Harding; "Some Economical Fundamentals of Freight Handling," by David B. Rushmore, Chief Engineer, Power and Mining Department, General Electric Company; "The Modern Trend in American Marine Terminals," by Robert H. Rogers, Power and Mining Engineering Department, General Electric Company; "Cargo Handling Methods and Appliances," by James A. Jackson, Power and Mining Engineering Department, General Electric Company; "Fuel Oil," by E. H. Peabody of the Babcock & Wilcox Company; "The Application of Diesel or Heavy Oil Engines to Marine Propulsion," by G. C. Davison; "The Diesel Motor Applied to Marine Purposes," by C. Kloos, Technical Director "Werkspoor," Amsterdam; "Terminal Works, Dry Docks and Wharves of the Panama Canal," by H. H. Rousseau, Terminal Constructor, Panama Canal Zone; "Aids to Navigation of the Panama Canal," by W. F. Beyer, formerly Assistant Engineer, Isthmian Canal Commission; "American Graving Dock Practice," by Leonard M. Cox, Corps of Civil Engineers, U. S. N.; "Dry Docks Recently Built in Italy," by Professor Luigi Luiggi, President Italian Society of Civil Engineers.

When it is considered that the above list comprises but one section of the Congress and that equally important and authoritative papers were presented before the sessions dealing with The Panama Canal, Waterways, Irrigation, Municipal Engineering, Railway Engineering, Materials of Engineering Construction, Mechanical Engineering, Electrical Engineering, Mining Engineering, Metallurgy, Aviation, Refrigeration, Agricultural Engineering, Engineering Education, Scientific Management and Heating and Ventilation, some idea of the scope and value of the transactions of the greatest engineering Congress yet held will be grasped. The Pacific Marine Review hopes that every engineer who visited the West Coast to attend this gathering has received both profit and pleasure from his stay among us.

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Warships of the First Line of Battle

By COLONEL E. FERRETTI, Naples, Italy.

THE author traces the convergent paths of evolution of the dreadnaught and battle cruiser during the past decade, the first sections of his paper leading up to considerations of a design which, in his opinion, embodies the fundamentals of offense and defense brought into prominence by the naval part of the present European war. The latter part of the paper is extremely interesting and is reviewed below.

In order that the fighting characteristics may be adjusted in such manner as to render the ship under design superior to any other now in existence, it is necessary to accept the following six fundamental principles: (1) Suppression of everything not absolutely required for purposes of naval warfare or for life on shipboard. (2) Reduction and simplification to the maximum degree of all auxiliary services. (3) Reduction to the minimum area of the target offered by the above-water body. (4) Adequate protection of the vital parts. (5) Definite separation between the grouping of compartments necessarily hot and those to be maintained at a low temperature. (6) Maximum arc of gun fire.

A ship of the line of about 32,000 tons displacement embracing the above characteristics will be set forth. The hull of the ship is constructed on the Isherwood type of longitudinal framing and with such scantlings as to insure exceptional stiffness and strength. The transverse bulkheads are spaced at intervals of from 10 to 23 feet. The outer skin of the hull is doubled throughout the zone of the double bottom from the lower margin of the armor plating nearly to the keel. The sides of the ship are divergent above water, even in the central part of the ship. The structure of the inner bottom is independent of that of the outer skin. It may be divided into three distinct parts; a central part (in the zone not in danger from submarine explosion), kept normally empty and dry; an intermediate part (where some danger from under water explosions exists), constantly kept filled with water or liquid fuel; and a lateral part (most in danger from torpedo or mine attack), kept always filled with coal in the wake of the motive power equipment, and with any suitable material for the remainder.

The structure of the ship contemplates 6 longitudinal bulkheads, disposed in pairs, with an intervening space of about 1 meter between each pair. The interior is thus divided into 4 zones, of which the two innermost constitute the part of the ship securely protected against under water attack, and here may be placed those organs of the ship which must be most carefully preserved. The usual form of protective deck brought down below the water line outboard, is suppressed and in its place are two reinforced decks, the upper continuous from stem to stern and the lower interrupted in wake of the propelling equipment.

In all the central zone, comprising that space covered by the emplacements of the heavy and intermediate guns, that is for a space of about 302 feet of length, the ship would only have about 9 feet of freeboard in load draft condition. Such a condition combines the triple objective of the minimum target, a broadside effectively protected and of armor plates suitably inclined with respect to the most probable trajectory in order to offer the maximum resistance to penetration.

In order to secure good nautical qualities and a suitable height for the heavy guns, superstructures are provided forward and aft with heights respectively of 23 and 19½ feet above load line. Every other superstructure is suppressed with the exception of the single stack, military mast, armored conning towers, fire control stations, tops for searchlights and the emplacements necessary for small boats.

The principal armament comprises ten 15″, 45-caliber guns, in groups of five each at the bow and stern of the ship. The five guns are disposed in one turret with two planes of fire, three guns in the lower and two in the upper plane, giving at each end of the ship a single emplacement with 320 degrees arc of fire. The height above the sea for these guns is as follows: Bow guns, 41 feet for the upper and 32.8 feet for the lower line of fire; stern guns 36.1 feet for the upper and 27.88 feet for the lower line of fire. Each gun is provided for 100 shots.

The secondary armament comprises twelve 7.5″, 50-caliber guns, subdivided into four emplacements of three guns each, located two towards the bow and two towards the stern, with line of fire outboard of the heavy guns, and each with an arc of fire of 180 degrees. The forward guns are 23 feet and the after guns 18 feet above load line and each gun is provided for 130 shots.

Twenty-eight 4″, 50-caliber guns, of which 18, of the disappearing type for high angle fire up to the vertical, are distributed along the uncovered central deck between the two superstructures; six are installed in battery at the bow and 4 in battery at the stern. The height above water varies between 13.1 and 16.4 feet.

Eight lateral under-water tubes for 21″ torpedoes are arranged in two separate chambers, one towards the bow and one towards the stern, between the motive power equipment and the ammunition and storerooms.

Ten twin searchlights are installed, of which 5 are carried on the military mast, 4 on the smokestack and

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1 at the stern on a special platform, which may be dismounted.

The ammunition rooms are grouped towards the bow and stern outside the machinery spaces in order to separate them from the principal sources of heat, thus avoiding too much confidence in the refrigerating plant in time of action. The ammunition rooms are arranged as far as possible between the double lateral bulkheads, right and left, intended, as will be seen later, to form a barrier to the results of under-water explosion. The outer compartments along the length of these storage spaces, at bow and stern, are to be kept filled with light displacing material to limit the invasion of water in case of rupture of the outer skin and to absorb and dissipate part of the energy of under-water explosions.

Suitable passageways are assured between the two groups of munition rooms by means of the spaces between the three pairs of bulkheads which extend through the machinery spaces and which contain the electric circuits, transmission and piping systems.

Protection against gun fire is assured by the reduced area of target, by an extended and effective distribution of armor over the exposed side and by a suitable inclination of the above-water side from the vertical. The proportional reduction of target area which may be realized without inconvenience in comparison with a battleship of the ordinary type may reach 25%, whence we may consider a like reduction in the probability of being struck. The protection sought is from 15.75" guns by means of armor of a maximum thickness of 11.8" and a minimum of 5.9", extended over the entire area along the water line, over most of the above-water body, over the base of the stack to 16.4 feet above deck and over the transverse bulkheads for protection against raking fire. For the protection of the main guns, the armor will possibly reach a greater thickness. All horizontal decks and especially those in the open, are protected by the exceptional strength of their structure, longitudinal in type, by their accentuated transverse curvature, and finally by separate layers of special steel, suited to resist heavy projectiles with the smallest angle of incidence or the fall of explosives from the air and also contributing to the organic rigidity of the structure.

The protection against subaqueous attacks is based upon the following fundamentals: (1) To confer on the outer skin of hull, throughout the danger zone from mines or torpedoes, a special strength against rupture by doubling the skin itself, solidly supported by transverse watertight bulkheads, and reinforced by continuous longitudinals. (2) To substitute for the ordinary double bottom, a strong internal skin effectively independent of the outer skin, but of equal strength and similar structure. (3) To double the usual distance between the two skins of the ordinary double bottom, making it about 6.56 feet in the horizontal parts and about 8.2 feet in the vertical parts of greater danger. (4) To carefully avoid, between the external and internal skins, vacant spaces which, following a rupture of the hull, fulfill the evil office of drawing towards the interior of the ship the chief violence of the explosion. (5) To dispose on each side, at about 16.4 feet from the inner and 24.6 feet from the outer skin, two strong longitudinal bulkheads, independent of each other and about one meter apart, destined to safeguard the interior of the ship containing the most important and vital organs. (6) To provide a minute subdivision by means of strong and closely placed watertight transverse bulkheads. (7) To provide for the ready escape upward of the products of any explosion which might penetrate into the interior.

The defense against aerial attack is assured through the protection of the open decks with their form markedly curved in the transverse direction and by suitable screens over all apertures in these decks.

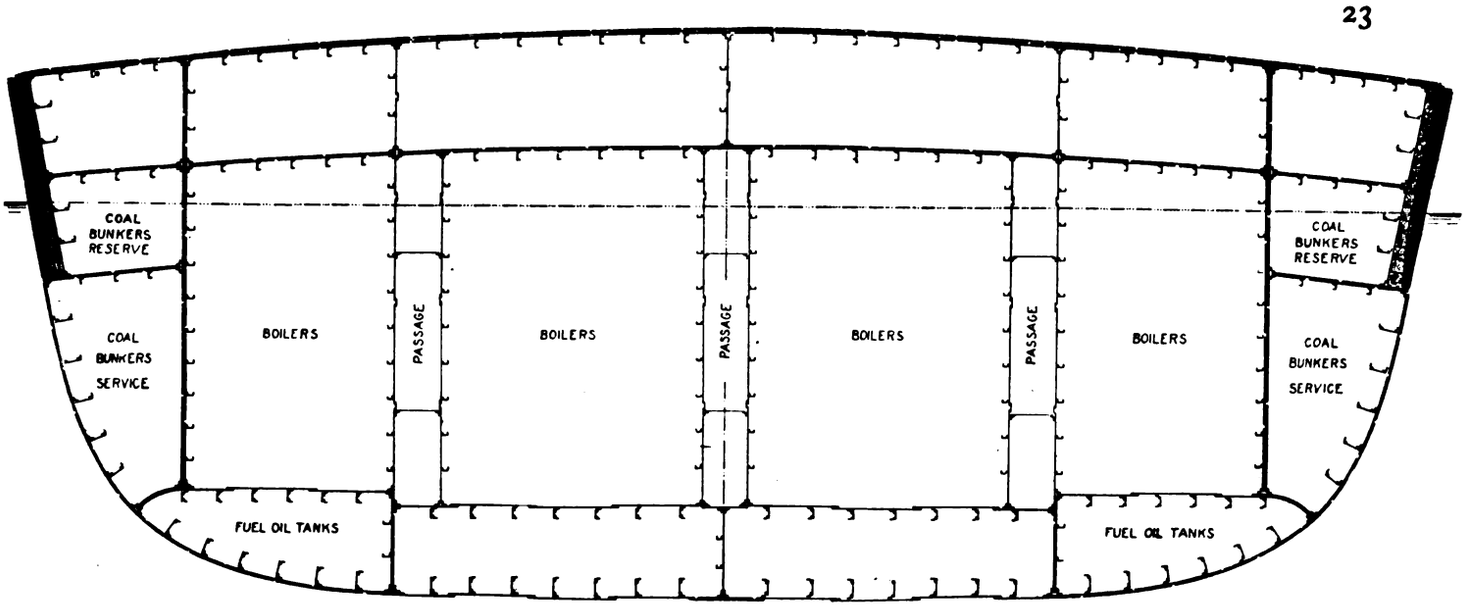
The boilers are grouped forward of the machinery space in such manner as to facilitate the use of a single stack. Ten of the boilers are arranged to burn either coal or fuel oil and ten to burn oil only. Each boiler is placed in a separate compartment and ten of them are located in the interior of the ship with respect to the double bulkheads.

The prime movers (turbines) are four in number, completely independent and each driving a propeller. It may be noted that two of the main turbines are located in that part of the ship destined to safeguard the most important and vital organs, in such manner as to constitute, with the ten boilers similarly located, a propulsive equipment of about two-thirds the normal full power which may be called the "safety propulsive equipment" and on which it will be reasonable to count as long as the ship is navigable.

The maximum speed of the ship in action is taken at about 26 knots, which implies a speed of 27 or 28 knots as a possibility. Space has been provided for a coal capacity of about 1500 tons and for a liquid fuel capacity of 1000 tons, which it is deemed will assure a sufficient radius of action. In fighting trim the wing coal bunkers should all be kept constantly filled below the armor belt. The purpose of this coal is essentially defensive and it is expected to minimize the effects of under-water explosions.

Apropos of a reported deal for supplying 130,000 tons of Yubari coal to the Interisland Steam Navigation Company of Honolulu by the Hokkaido Tanko Kisen Kaisha (this is the first big export of Japanese coal to Hawaii, which has hitherto bought Australian coal), it is interesting to note that despite the fact that Japan has materially decreased her colliery output this year that the stocks on hand have mounted up to the unprecedented amount of 1,300,000 tons.

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Cross section of battleship to illustrate Colonel E. Ferretti's paper on "Warships of the First Line of Battle."

Ocean Freighters

By ERNEST H. RIGG, M. I. N. A., Mem. S. N. A. & M. E., Camden, N. J.

DURING the past ten years considerable progress has been made in design proper; the full cargo boat now receiving much attention in tank experiments. On an ordinary cargo vessel a 5 per cent. saving in fuel equals about $2,000 per year, and when such a saving is spread over a merchant marine the conservation of fuel becomes at once apparent. In addition to the best lines for a given fullness, designers are also working to get the economical relationship of dimensions, speed, length of voyage, etc. Increased attention is being paid to questions of stability and reliable instruments are gradually being introduced enabling ship's officers to keep tab on loading and stability.

There has been a total and sweeping revision of classification rules during the past ten years. Lloyd's Register and Bureau Veritas have issued new rules that swept aside the old and clumsy tables; the influence of classification societies on cargo vessels is bound to be considerable; they form a link between builder and owner that should be of value to both.

With the present (March, 1915) demand for cargo ships, the formation of a New York Committee of Lloyd's Register, similar to those of Liverpool and Glasgow, appears to the writer to be worthy of consideration. There is probably a large number who would favor an independent American body. It is to be regretted that the American Bureau is not the strong organization that it might be; modern requirements are exacting and a large staff is necessary to give the yards the required service; few modern ships are straight rule types, and technical knowledge of an advanced order is required.

Improvements in channels and bulb angles in the United States come along slowly, some larger zees would also be acceptable. The possibilities of reduced riveting following improvement in shapes are considerable. The American shipbuilder is undoubtedly handicapped in this matter, but there is good reason to believe that the present activity in American shipbuilding will lead to more sections being rolled in American mills.

Among the chief advances relative to safety of life at sea must be noted the increasing adoption of the British Board of Trade Freeboard rules. When the International Load Line Conference is able to meet, new rules for load line and deck loads may be expected. Bulkhead subdivision is limited by conditions on a cargo steamer. After fitting fore and after peaks, shaft tunnels and isolating the machinery space by bulkheads, others are only those required for necessary strength. In oil tankers practicable unsinkability is obtained, but large open holds are prime necessities in the general cargo boat. Other improvements noted during the past decade are better crew quarters and a great advance in the character of the food supply due to refrigerating equipment.

Ocean freighters can be divided into two main divisions, cargo liners and tramps. Standardization in the tramp is natural. The tramp is to be generally useful, the larger the more economical, but channel depths and accommodations at the smaller ports soon force a compromise in size. An average vessel would be a 7000-ton d. w. carrier on 22′ 6″ draft and 360x50x29′ 6″ molded dimensions.

Statistics give the following average dimensions for cargo vessels:

	1890	1900	1910
Length	285′ 0″	312′ 0″	340′ 0″
Beam	37′ 0″	41′ 6″	46′ 0″
Draft	19′ 3″	20′ 6″	21′ 6″

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As harbors are steadily being improved the average size will steadily increase.

Turning to types of cargo carriers, the single decker has been greatly developed recently. Hold pillars are now eliminated entirely if desired. Single deckers up to 34′ 6″ molded depth are being built to the highest class, and for such ships side framing has attained a depth of fifteen inches. The omission of side stringers is becoming marked, and while in vessels of great depth it is scarcely advisable to fit no stringers on account of tripping frames, the classification tabular number can well be reduced. Joggling frames and beams are now very general. Twin masts and king posts are resulting in shorter booms and better working conditions. Wide spaced framing is being adopted in many ships, and while there is no saving in weight there is a saving in the number of parts to be handled. Topside tank ships have come to the front and for vessels requiring to make long voyages in ballast the type has many advantages. It is noted that the turret and trunk steamer have not lasted as general types. The revival of the longitudinally framed ship as brought out by Mr. J. W. Isherwood has been very marked during the decade just passed. The system is ideal for oil steamers and all long shallow hulls. The general advantages for all types are less structural weight, reduced vibration, greater longitudinal strength and greater capacity in some instances; the disadvantage is transverses sticking out into the hold and holding up coal or bulk cargo on the longitudinals. The elimination of wood decks is noticeable, plain steel being the rule in cargo spaces and many substitutes for wood in living spaces.

The Panama Canal is already influencing ocean freighter design. The American-Hawaiian vessels are probably the best type of large ocean carriers built for canal trade. The latest ships of this fleet are 430′ 0″ x 53′ 6″ x 39′ 6″, carry 9000 tons on 28′ 0″ draft, make 12 knots at sea, are fitted with all the decks their depth will allow, use oil fuel with single screw drive. Radical departures from standard types do not appear to be imminent, but it is safe to say that the canal ship will be larger and faster than those in use as freighters on either coast.

The large amounts of money being spent on terminal facilities are bound to have an increasing effect on ship design. The writer recalls an instance of a fine new ship being butchered to meet the requirements of a ramshackle wharf that would not last five minutes in a brisk fire. Wharves will, in the future, be so arranged as to give reasonable latitude in the arrangement of the ship. Rapidity of despatch becomes more important the larger the ship is, also the more self sustaining she becomes in the matter of minor repairs.

Lumber steamers are in a class by themselves; they should be specially designed and proportioned for their trade and then deck loads are by no means the menace they are in an ordinary steamer. Trouble is apt to arise, however, when ordinary cargo steamers load lumber to their European freeboard and carry a deck load to do it. The use of fuel oil makes security of deck load doubly necessary. The solution is minute division of oil tanks to avoid large free surface losses in stability. The deep center line tank adopted by Mr. E. S. Hough meets this point admirably, though open to the defect of large calking surfaces exposed to damage, as compared with ordinary deep tanks.

The past ten years has witnessed great changes in motive power. The well nigh universal means of propulsion ten years ago was the compound or triple expansion engine. Scotch boilers were in undisputed possession of the field and were coal fired. What do we find to-day? Steam turbines have made wonderful strides, motor ships are quite common and cargo steamers are being driven by high speed turbines mechanically geared down to normal propeller speed. Electric reduction gear is being seriously proposed, likewise hydraulic gearing and oil fuel is being used on many routes where a cheap supply is obtainable. Reciprocating engines are still the principal type of motive power, but geared turbines are capable of roughly a knot greater speed on the same fuel consumption. Motor ships, particularly where twin screws are adopted, are making progress in low powers. The electric drive has hardly emerged from the purely experimental stage for cargo vessels. Of the several alternatives the geared turbine looks the most promising for cargo vessels, particularly since improved methods of gear cutting have been adopted. The saving in economy of fuel consumption for a single screw installation averages about 15% and in the case of twin screws 20% over reciprocating machinery. A saving of about 10% in engine weights is effected and often a frame space or two can be cut off the engine room space. Splendid work looking to economies in screw propellers is being carried on by Chief Constructor D. W. Taylor, and Captain C. W. Dyson, U. S. N., and Professor H. C. Sadler, of Ann Arbor University. Coal per diem is keenly watched by owners and it behooves every cargo builder not to let his competitors get ahead of him in economy of propulsion.

To keep up with the adoption of internal combustion engines, attention is being given to reducing the number of steam auxiliaries, though the exhaust gases from the main engines can be utilized to keep steam up on a donkey boiler. The hydro-electric steering gear is now being fitted on quite a number of ships.

As regards the present status of ocean going

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cargo ships, it is evident that we are at the beginning of a period of increased activity; large ships are the rule, notably so in oil tankers, in which longitudinal framing is firmly established. All eyes are turned towards new types of propelling machinery and considerable economies of propulsion are confidently looked forward to, and have already been realized in some instances, notably those of geared turbines and motor ships. The increased attention given to safety of life at sea will probably result in cargo vessels being required to carry boats enough for all hands on each side of the ship. The submarine tactics being employed in European waters against merchant steamers will scarcely have any permanent effect on cargo ship design; they merely furnish a temporary argument for closer bulkheads.

Mr. James French, at present Chief Surveyor for Lloyd's at Glasgow, Scotland, and who has a host of friends on both the Pacific and Atlantic coasts gained through frequent visits to this country as a special representative of Lloyd's, in discussing the paper above offered the following appreciation of American shipbuilding and Mr. Rigg's paper:

I have listened to Mr. Rigg's paper to-day with a great deal of pleasure, and I congratulate him on having produced a paper the perusal of which cannot fail to be of much interest not only to shipbuilders, engineers and shipowners, but to all who are in any way concerned in shipping.

In particular I must thank Mr. Rigg heartily for the remarks which he has made regarding Lloyd's Register of Shipping. Mr. Rigg in the responsible position which he occupies as Naval Architect of the New York Shipbuilding Co., is brought into close touch with the work of Lloyd's Register, and I am very glad to find that he so much appreciates that work.

I note with satisfaction that Mr. Rigg, as the result of his experience, discourages the multiplication of classification societies and classification standards, and in that I think he is perfectly right.

Speaking from my own experience, which is pretty extensive both in America and in Great Britain, I quite agree with Mr. Rigg that the setting up of different standards of safety in ship construction is much to be deprecated, alike in the interests of shipbuilders, shipowners and underwriters.

As I have seen some statements published recently which seem to show that even people who might be expected to be specially well-informed on the subject have quite a mistaken notion regarding the constitution of Lloyd's Register of Shipping, I may be permitted a few words of explanation on that point. I have seen it stated, for instance, that Lloyd's Register is a combination of shipowners and shipbuilders by whom the interests of underwriters are ignored. This, of course, is quite incorrect.

Lloyd's Register of Shipping, which first took its rise in 1760, was founded exclusively by underwriters. Indeed, so much was it identified by the underwriters as their own Register that in 1799 the shipowners started an opposition Register. The result, as might have been expected, was unsatisfactory, and in 1834 the Lloyd's Register of Shipping as we know it to-day arose Phoenix-like from the ashes as a newly-constituted Register on which there was equal representation of underwriters, merchants and shipowners.

As time has passed, the society has broadened its basis of representation and now contains also representative shipbuilders and engineers on its committee of management.

But through all the various changes which the Register has undergone, the underwriting interest always has been, and is now, not only adequately but powerfully represented.

While the function of the society remains to-day, as in the past, to safeguard the interests of the underwriters who cover the risks of the shipowner and the merchant, it is well equipped through its broadly representative committee and its highly scientific and practical staff to deal in a sympathetic spirit with the changing conditions which the enterprise of shipbuilders and engineers is continually evolving.

It is thus, and only thus, that Lloyd's Register has attained the unique position which it occupies. At the present time there are over 24,000,000 tons of shipping holding the society's classification, and in the last completed year before the war more than 2,000,000 tons were built under the special survey of the society's surveyors.

I well remember that on the occasion of the launch of the "Aquitania," Mr. Ellis, the managing director of Messrs. John Brown & Co., the builders of that vessel and also of the "Lusitania," used these very striking words: "What the mercantile marine owed to Lloyd's Register very few people had the slightest idea. They had amassed an amount of knowledge from all the experience that they had had that was practically invaluable, and I wish to acknowledge publicly the services they rendered to the Cunard Company and to the builders in assisting them in the design of the 'Aquitania.'"

This is the verdict of one of the foremost shipbuilding companies in the old country, and I think it is one which will be endorsed by many in America.

Having been stationed in the United States for several years, and having had much to do with the society's business there, it is a source of great personal gratification to me to find that the classification of Lloyd's Register is so much appreciated in this country. The overwhelming majority of the tonnage under construction and in preparation in the United States is intended for classification with Lloyd's Register, and I feel quite sure that in thus adopting the highest standard of classification for her mercantile marine, the United States is acting in the best interests of shipbuilders, shipowners and underwriters, and, especially, the public safety.

I fully appreciate the remarks Mr. Rigg has made regarding Lloyd's Register, and am much interested in his suggestion regarding the establishing of an American committee of Lloyd's Register in New York.

Of course, this is a matter which I, as a surveyor, am not in a position to discuss. My duty here is to visit the various shipbuilding establishments and steel works with a view to reporting to the committee on the society's business arrangements in the States, but I shall make it my duty also to report Mr. Rigg's suggestion and the interesting discussion to which his paper has given rise.

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Development of the Marine Steam Turbine

By LIEUTENANT COMMANDER H. C. DINGER, U. S. N.

THE number of types of marine steam turbines proposed is almost countless. The really successful types are very few. The most generally successful marine turbine now in use represents the results of more than 20 years of application and it required years of development to determine the details and proportions that would make it a reliable machine.

There are two basic types of turbines in the marine field: the impulse and the reaction type; and lately a combination of the two has been developed.

In the impulse turbine the steam is first expanded in a nozzle and the energy of the steam is converted into velocity, which is transformed into mechanical work when the steam impinges upon the rotating blades of the turbine. This turbine has its blades designed for the impulse action of the steam and owing to the high velocity, the blading must be made, generally, heavier than the blading of a reaction turbine. Although the idea of the design is to have the expansion complete in the nozzles, some expansion also takes place as the steam passes between the moving blades.

In reaction turbines the blading is such that the expansion of the steam takes place while passing through the moving blades, and the velocity of the steam is greater when leaving than when entering. Stationary blades are mainly provided to give proper direction to the flow of steam from one row of moving blades to another. In actual so-called reaction turbines about 50% of the expansion takes place in moving blades.

A further distinction may be made as follows: (1) Reaction turbine in which the full expansion does not take place in a turbine driving a single shaft, but where the steam passes through several turbines arranged on several shafts. The Parsons turbine is the only successful turbine of this type that has been generally applied to marine work. (2) Impulse turbines in which the complete expansion occurs in a turbine on one shaft; sometimes known as one-shaft turbines.

There has been a tendency to use impulse blading for the H. P. end and reaction blading for the L. P. end of the expansion. The so-called impulse turbines now nearly all use the drum construction for the last stages. This tendency has resulted in designs of turbines that are really a combination of the impulse and reaction types. Examples of these are the Westinghouse-Parsons marine turbine and the Parsons turbine fitted with impulse stage in lieu of cruising turbines as applied to many recent British naval vessels. The Parsons Company has always recommended the use of reaction blading as being the more satisfactory and giving better results. For shore work, in the United States, the impulse turbine as represented by the Curtis units built by the General Electric Company, has shown itself generally somewhat more economical than the Parsons, and it may appear proper to expect the impulse turbine to approach the reaction type in economy for marine work when the design is so developed as to overcome mechanical defects.

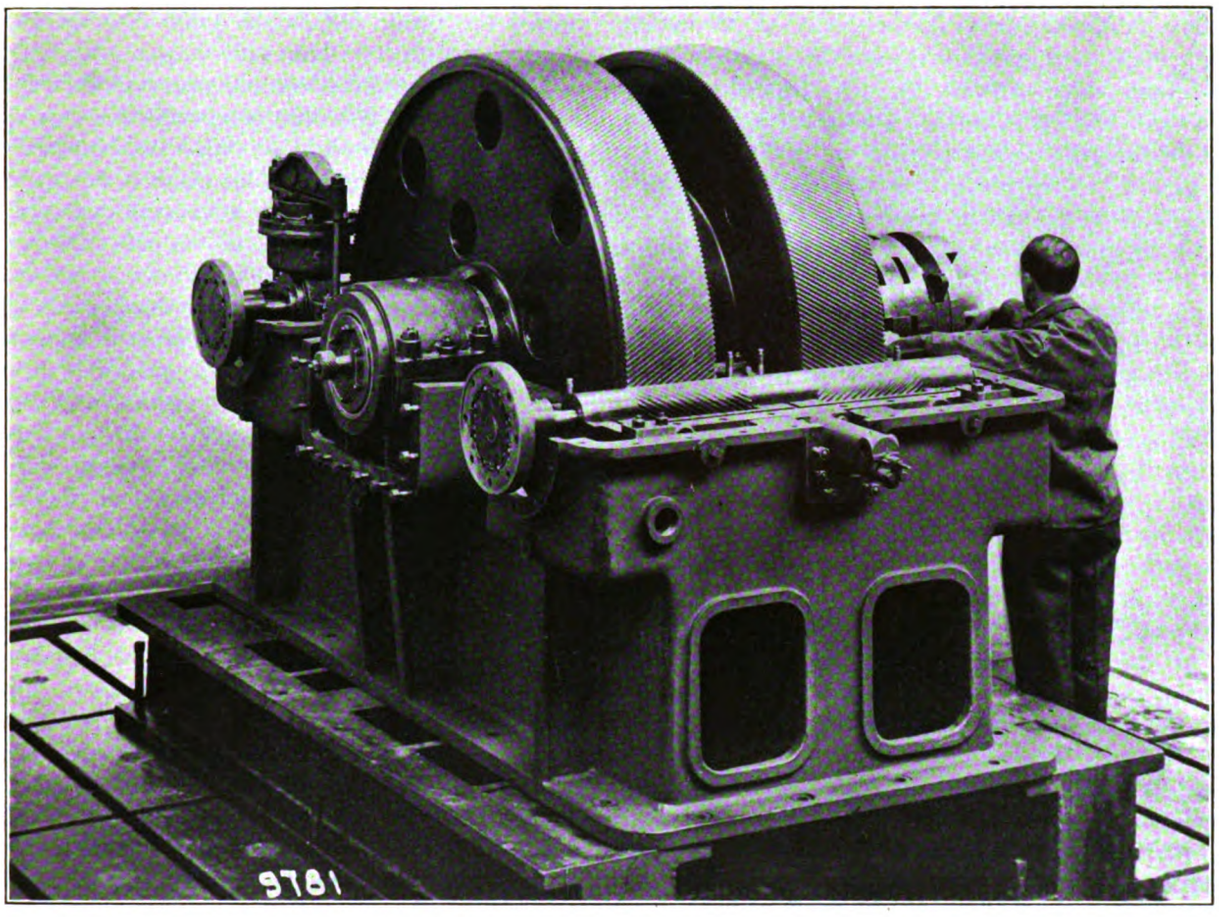
The reaction turbine is of simpler construction due to the fact that the details are known and experimentation has been practically left behind. On the other hand, this turbine requires a higher rotative speed to secure economy and necessitates a division into a H.P. and L.P. casing.

The impulse turbine can be contained in one casing. Slower speed can be used. Less space is required. The number of nozzles in use can be varied and thereby improve the economy at low powers; but the reaction turbine with cruising turbines is generally more economical.

One of the drawbacks of the turbine is its lack of reversibility, except by adding a special reversing turbine. While the backing power can be made satisfactory by the addition of powerful backing turbines, in no case is there secured the full backing effect possible with reciprocating engines. Turbine advocates have, by argument, even gone so far as to state that in the turbine the power to stop or reverse the direction of the ship is more effective than with piston engines. This is faulty argument. In a reciprocating engine when the link is thrown over, the change in direction of movement is immediate. In the turbine, the inertia of the moving parts has first to be overcome and the turbine must first be stopped before it begins to rotate in the opposite direction. It requires some appreciable time after steam is turned on the astern turbine before the tubine is actually going in the astern direction. No line of argument can alter actual results when turbine vessels and those with reciprocating engines are maneuvered together.

In order to secure better economy at low speeds, cruising turbines are fitted in connection with Parsons turbines on Naval vessels. With the Parsons installation, the cruising turbines usually consist of a H.P. and L.P. cruising turbine. On commercial vessels, cruising turbines are not fitted, since these vessels usually steam at somewhere near full power. The fitting of cruising turbines adds considerable weight; there is extra piping and several additional glands which may impair the vacuum. In view of the above, cruising turbines have not been fitted in recent British naval vessels, and the alternative of providing an additional stage or stages at the high pressure end of the H. P. turbine has obtained, so that when it is desired to run at lower fractions of power the full pressure drop of the steam can be

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Westinghouse reducing gears, a type that has met with splendid success both in naval and mercantile work.

utilized. At higher powers, steam from the boiler may be added through by-pass valves at intermediate stages. Thus, under working conditions, down to somewhat below half power quite satisfactory economy is secured. At below half power this alternative does not give us good economy by 10% to 20%, as with the separate cruising turbines.

Turbine installations for the merchant service are usually the three-shaft arrangement,—one H. P. turbine exhausting into two L. P. turbines, with backing turbines in the L. P. casings. In a few cases twin screw arrangement have been used, with the H. P. turbine on one shaft and the L. P. on the other. With a view to improve the economy, four-shaft arrangement having a H. P., I. P. and two L. P. turbines, have been adopted on some recent vessels, and this arrangement enables better economy at lower speeds. A few impulse turbines have been used. These are mostly two-shaft arrangement. The "Imperator" has a four-shaft arrangement of this kind using Curtis-A. E. G. vulcan turbines.

In using both turbine and reciprocating engines one or more reciprocating engines are used in combination with one or more L. P. turbines. By means of this system special advantages in economy are obtained. The reciprocating engine is more economical in steam consumption than is the H. P. end of a turbine, while the L. P. end of a turbine is more economical than the cylinder of an engine. Consequently, in the combination each type of engine operates for that portion of the cycle for which it is best adapted. The backing power is supplied by the reciprocating engine, which is more effective than the backing turbine. The combination enables superheated steam to be used, which is considered inadvisable in connection with reaction turbines.

The electric drive, hydraulic transmitter and reduction gearing have been put forward in order to combine a high speed turbine with a slow-running propeller and so obtain the greatest efficiency of each.

The electric drive has been installed on two seagoing vessels, the "Jupiter" and the "Tynemouth." In the electric drive a high speed turbine or a Diesel engine drives a generator, and the current drives alternating current motors placed upon the propeller shafts. The efficiency of the transmission is 91% to 92%. This system has greater flexibility than the gear, can obtain a better comparative economy at cruising speeds, and has special advantages in the matter of handling and facility for overhaul while underway. It is considerably heavier than gearing and requires more space for installation. It is, however, considerably lighter than the direct drive and for varying speeds and at cruising speeds will probably be as economical as the gear.

The Fottinger hydraulic transmitter employs a high speed turbo centrifugal pump with a water

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turbine designed for a slower speed of revolution. The pump is coupled direct to the steam turbine, and the water turbine to the propeller shaft. The pump and water turbine are placed in one casing and so designed that frictional and eddy losses are reduced to a minimum. The transmission efficiency is about 90%, though its promoters claim that if the heat generated in the water is used for feed heating, the final efficiency is about 92%. The speed ratio is usually about 6 to 1 though somewhat larger ratios can be employed. This gear, like the electric drive, has the advantage of being able to employ a non-reversible turbine. About 85% of full go ahead power can be secured for backing. In a single unit, powers up to 10,000 horsepower have been transmitted. Some saving in weight over the direct turbine drive is realized. Apparently, it will secure about the same economy as the electric drive, but does not give as great flexibility.

Westinghouse gearing, which is hydraulically balanced, was used on the collier "Neptune." Gearing is being used with Parson's turbines on the destroyer "Wadsworth," the submarine tender "Bushnell" and the destroyer tender "Melville," and is being extensively used in connection with geared cruising turbines on late battleships and destroyers. The loss by gear transmission is not over 2% and the wear on the teeth is unappreciable. The gear ratio used varies from 5 to 1 to 20 to 1. The use of gear saves considerable weight and secures 10% to 15% better economy than the direct drive. Gearing is especially suitable for merchant vessels of low speed and moderate power and for destroyers and fast cruisers.

For commercial high powered vessels, a perceptible gain in economy has been secured by using turbines, also a reduction in cost of installation and saving in space in special instances where very large powers are used. For low or moderately powered vessels the direct driven turbine offers no advantages in overall economy, space or cost over a well designed, up-to-date reciprocating engine. Vibration is avoided. The use of oil for internal lubrication is avoided and this results in much better conditions for the boiler plant. The operating conditions are considerably improved and the machinery can be more easily maintained in a state of repair.

For naval vessels the particular advantages are greater flexibility in changing from one speed to another. The ability to maintain full speed continuously is better, there being less danger of bearings heating, joints blowing or other small derangement. In the case of very high powered vessels the machinery can be placed in a more confined space. Better economy at full speed is obtained. The absence of vibration makes a steadier gun platform. For high powered naval vessels the cost of building is less, but though the cost of repairs should be less, the presence of a large amount of blading troubles has caused the repair bills to be fully as great and, in many cases, greater than with reciprocating engines.

The marine turbine has, in most engineering literature, been credited with a considerable saving in fuel consumption, weight and space as compared with the reciprocating engine. This claim is not generally borne out in practice and the advantage of the turbine in the matter of economy is shown only in very high powered vessels. The turbine shows a better consumption of fuel, but when the propeller efficiencies are considered there is no material gain in economy over a thoroughly well-designed quadruple or even triple expansion engine. The saving in space has not been material, and on large naval vessels the turbines actually call for more space than is required by the reciprocating engine. The advantages of the directly connected turbine for the vessels on which it has been adopted lies chiefly in other fields than fuel economy or reduction in space.

A marine turbine is not economical at low powers. This is a serious disadvantage and one that has arrested the progress of installations on war ships to some extent. It is due directly to this fact that the United States navy went back to reciprocating engines in the battleships "New York," "Texas" and "Oklahoma." By the introduction of cruising turbines, the turbines may secure a fair economy at low powers, but even with the best cruising turbines the well designed reciprocating engine using superheated steam has an advantage of 5% to 8% at 12 knots speed. The electric drive, using two or more generators, and the combination of reciprocating engines and L. P. turbines, will probably give better economy at low speeds than will the reciprocating engine. The direct connected turbine can not be successfully applied to a vessel that operates for any considerable part of the time at low speed. The turbine is suited for high speed and constant speed conditions.

Superheat is not usually employed with Parson's turbines and the reason for this is that, on account of the small clearances, and the wide variation of temperature that may be present may cause distortion, which may result in blading troubles. Superheat is, however, used in some cases with Parson's turbines with success. It is usually used where the impulse type of blading is used. The impulse blading has larger tip clearances, and hence a greater variation of temperature is not considered especially dangerous. Superheat adds considerably to the economy.

Turbine installations have by no means been free from mishaps, and blade stripping is not an infrequent occurrence. In Parson's turbines, blade stripping is usually caused by a distortion of casing or rotor. Difficulties with thrust bearings have been encountered in Parson's turbines in cases where a condition of unbalance, of any considerable amount, is produced between steam and propeller thrust. In the Curtis and Zoelly turbines there has been considerable difficulty due to the inability to allow prop-

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erly for the longitudinal clearance between the stages under different conditions of power. Movements take place that cause a rubbing of the sides of blading and a consequent wearing away of the shrouding, resulting finally in the blading being ripped out.

Rusting of interiors of turbines has also been experienced. This is due to the accumulation of water and access of air. If the turbines are kept dry by operating the air pump for a short period several times a week, the accumulation of water is avoided. Various types of paint have been used for protecting the interiors from corrosion but none yet tried appear to be very effective.

The introduction of the marine turbine has had two very material effects upon marine machinery in the development of methods and apparatus for securing better vacuum and better efficiency for high-speed propellers. With the reciprocating engine, though a better vacuum is desirable, the increase in economy is not nearly as great as it is with the turbine, and, in fact, it is chiefly due to this ability to use a high vacuum that the good economy of the turbine can be realized. Condenser design has consequently received more scientific attention.

The turbine is a high-speed machine, hence it is desirable to have high propeller speed, which detracts from propeller efficiency; but the need for using relatively high speeds has caused special investigation into propeller design to be made, with the result that propellers on destroyers operate at 900 revolutions with 60% efficiency.

The Diesel Engine Applied to Marine Purposes

By C. KLOOS, Technical Director of "Werkspoor," Amsterdam.

WHEN speaking on this subject it is necessary to distinguish engines for naval from those for mercantile purposes. Naval Diesels are nearly exclusively found in submarines. They are all high speed and compactly built and part of the reliability and durability must be sacrificed to obtain lightness and small bulk. Also the fact that the parts are badly accessible is no objection, because plenty of time is always available for repairs. As the marine Diesel was used for naval purposes first, some of the engines for mercantile purposes have experienced the drawbacks of their resemblance to naval motors. The first marine Diesels of any size were started in Russia and were destined for ships owned by Nobel Brothers in Petrograd.

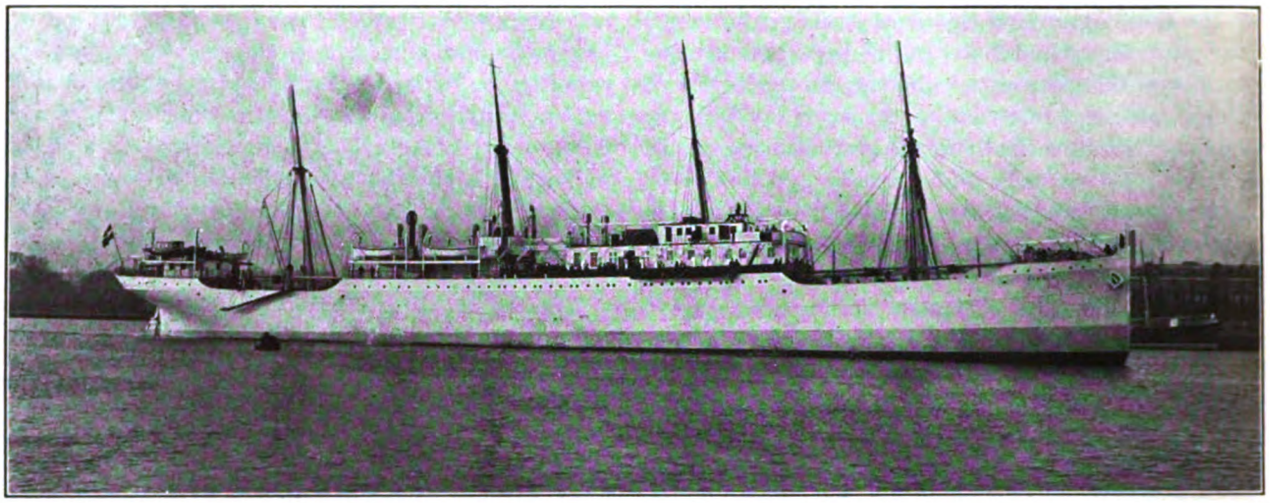
The fact that marine Diesels were first built in Russia was due to the presence of oil wells at the Caspian sea, whereas other fuels are very expensive in that vicinity. That cheap oil and expensive coal do not necessarily lead to the early adoption of marine Diesel engines is demonstrated on the Pacific Coast, as the western people thought it best to burn their oil under boilers. There existed in Russia several marine Diesels long before the rest of the world considered their manufacture. The construction was mainly the same as the standard land engines of the M. A. N., with some changes, but in the present-day big Diesel engines for sea-going ships only the valves and valve gear are copied from the original land engines. A few small marine Diesels were turned out in 1910 by Sulzer Brothers of Winterthur and the M. A. N. These were high speed, box-frame engines of comparatively low power and did not yield much satisfaction in continued service, nearing too much the style of submarine engines. The 600 b. h. p. land engine exhibited by the Werkspoor Works of Amsterdam at Brussels in 1910 was of a general construction since followed in many big marine motors.

Up to 1910 all Diesel engines were designed with the long trunk piston in which the gudgeon pin was fixed, to which the connecting rod was connected. In the Werkspoor engine for the first time a box-shaped short piston with piston rod, cross-head and guide was introduced, such as are now common practice. In this motor, for the first time in a large motor, were applied the four tie rods round each cylinder, coupling most directly the upward forces due to the pressure on the cylinder heads and the downward forces on the main bearings due to the pressure on the pistons. By these means it became possible to keep the cast iron frame very light and to provide for big apertures, as this box-shaped frame had to carry the weight of the cylinder only, no forces being transmitted through it. This design is adopted in most of the later marine Diesel engines.

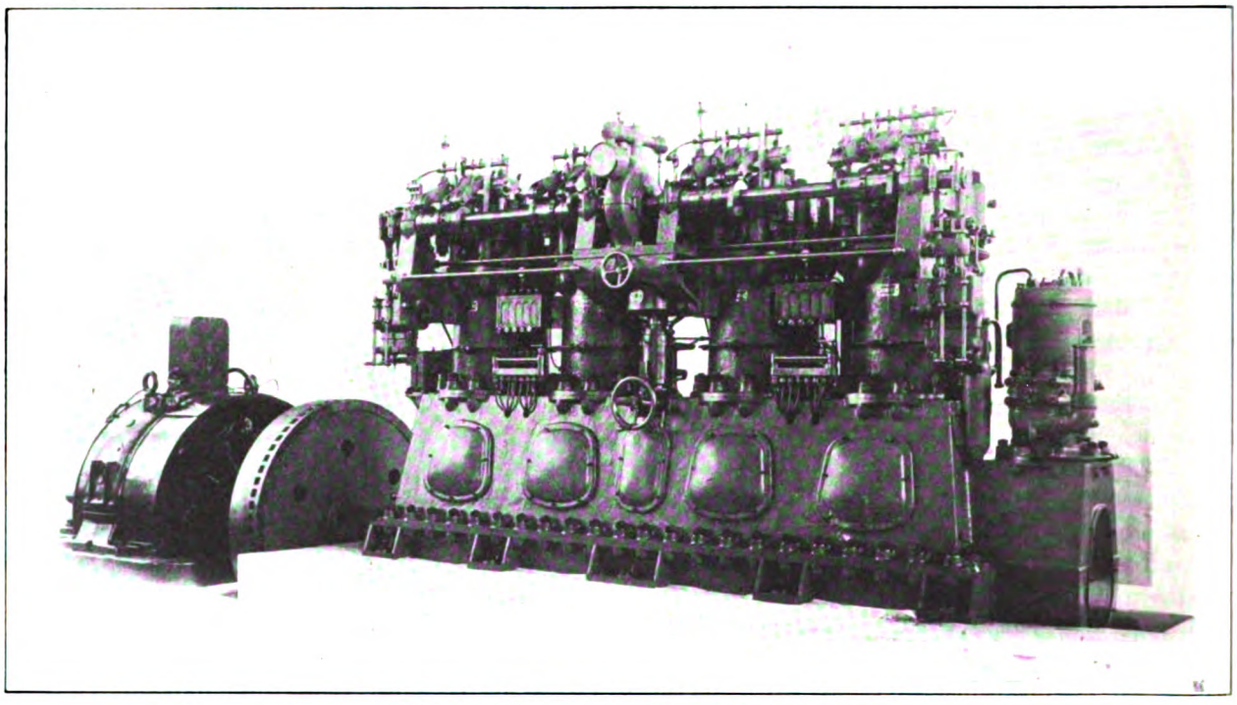
After the small marine Diesels of Sulzer & Nurnberg, the six-cylinder engine of the "Vulcanus" came as the first full-powered reversible Diesel. The engine had a capacity of 450 b. h. p. at 180 revolutions, the cylinder was 15.7″ bore and 31.5″ stroke. The engine was built at the Werkspoor Works of Amsterdam. In the beginning of her existence trouble was encountered with the air compressors and also through the lack of experience of the engineers. The ship, however, is now in permanent service in India to the full satisfaction of the owners.

In the engine of the "Vulcanus," the crank shafts and guides are enclosed in a casing; the rear and side walls are made of cast iron and shut off in front by light steel sheets. For the big forces tie rods are again applied, connecting the cylinder beam to the bed plate. The latter is trough shaped to collect the lubricating oil. The lubricating oil is forced to

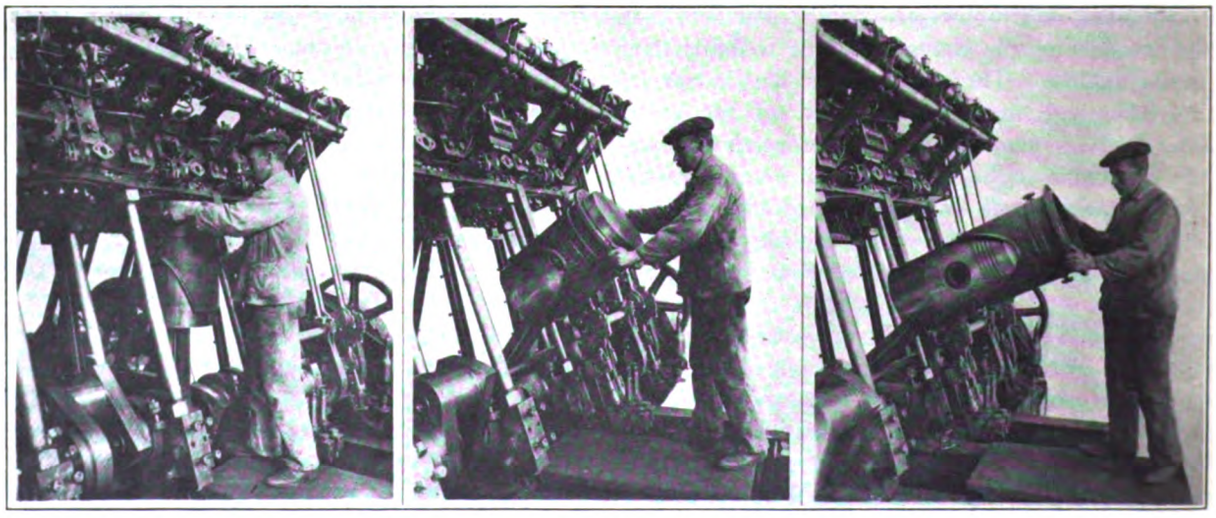
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Motor ship "Fionia," one of a large and successful fleet.

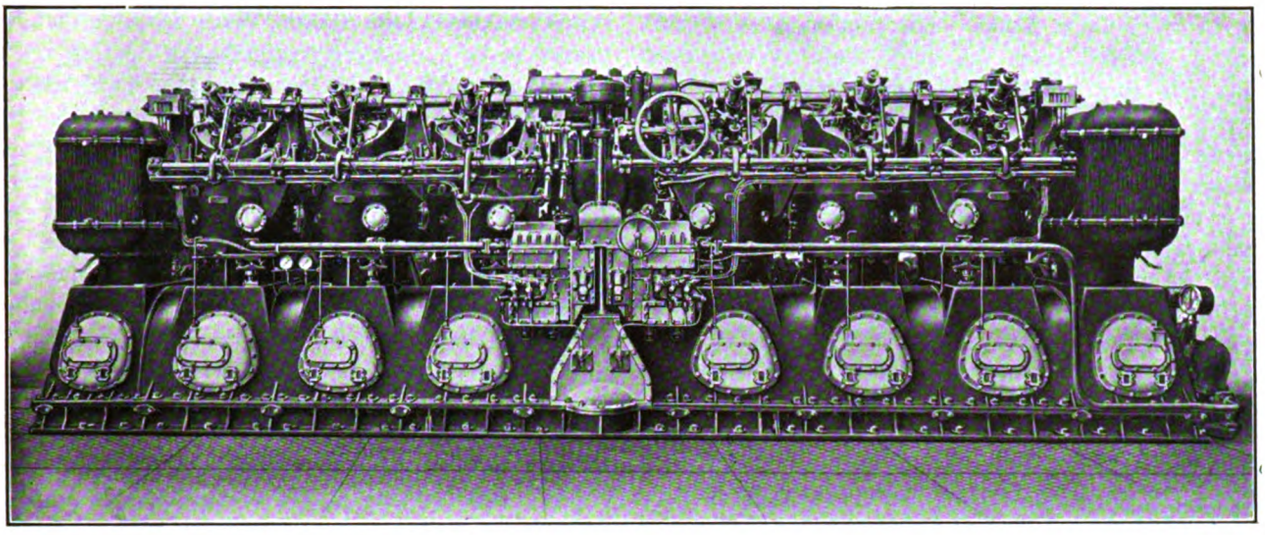


Nobel Diesel fitted with Del Proposto reduction gear.

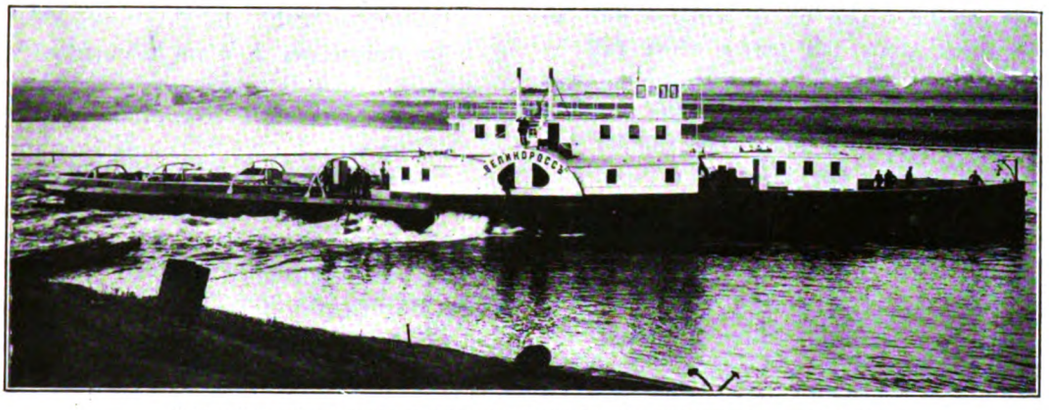


Removing cylinder extension from Werkspoor Diesel engine.

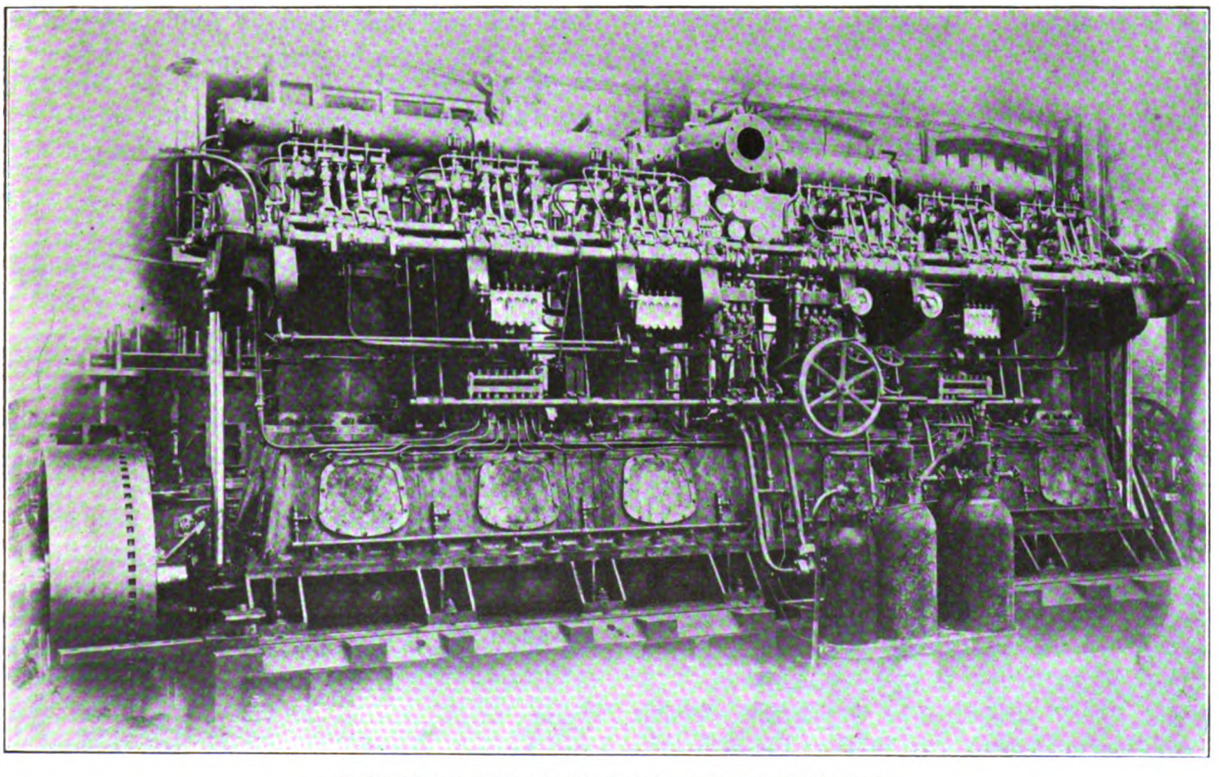
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A 1000 horse-power Krupp Diesel motor.



A Russian Diesel-engined side-wheel tug in use for years on the Volga.



Nobel-Diesel engine of the Russian gunboat "Ardagan."

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the bearings by a pump. The motion of the cam-shaft is derived from the main shaft by eccentrics and rods that work on a small crank-shaft that carries a pinion. This pinion works on two gear wheels of twice the number of teeth, thus reducing the speed of the cam-shaft to half the engine speed, as is necessary in a four-cycle engine. The cylinder beam carries the cylinder liners and on the top are fixed the cylinder heads. All the bearings for cam-shafts, rocker-shafts, etc., are attached to the cylinder beam. The beam serves also as a water jacket.

The engine is directly reversible, there being two cam-shafts. The hand wheel for the reversing is mounted on a handle case, where all the operations necessary for reversing, starting, regulating and stopping can be controlled. It also carries a telegraph. The valves and levers in the cylinder heads do not differ from ordinary four-cycle land practice.

There is only one fuel pump and one spare pump for the whole engine. The oil is pumped into an accumulator, which stops the pump when full by keeping the suction valve open. The "Vulcanus" was first equipped with an accumulator for this purpose, consisting of two plungers in line. The smaller one worked through a stuffing box in a cylinder containing oil, the larger one in a cylinder with air, directly connected with the air line for in-blast. The pump was automatically cut out by the motion of the plunger and then the latter forced the oil to the cylinders. When near its end position it brought the pump into action again. This arrangement was soon replaced by what is generally called the "floating vessel."

This vessel is placed high in the engine room. The bottom is connected to the delivery of the fuel pump and to the fuel inlet valves on the cylinder and the top is connected to the in-blast air line. This vessel is mounted on a balance with counterweight, in such a manner that it will sink a few inches when full and rise when empty; this motion is transmitted to the suction valve of the fuel pump, which is thereby kept open or left free. But one fuel pump is required for the six cylinders, as the distributors work perfectly with only a difference in pressure before and after the valves in the distributor equal to the pressure of a few feet of oil column, according to the height of the floating vessel above the fuel valves in the cylinder heads. Another advantage is the amount of fuel always ready for starting and in case a pump should get out of order. This floating vessel has given great satisfaction.

The "Vulcanus" held for a full year the place of being the only full-powered sea-going Diesel engine ship afloat, when the "Sembilan," built by Werkspoor came into service. This ship has a comparatively small engine, 200 b.h.p., in three cylinders of 15.75" bore and 19.68" stroke. The engine is reversible. The whole arrangement was built on the style of a much larger engine and experience with the "Vulcanus" influenced the design. Many features that had proved to be good were retained—the floating vessel, the tie-rods, the links for the cam-shaft motion. The Werkspoor patent piston-dismounting device was introduced. The overhauling of the pistons was thereby much facilitated. The piston is dismounted from below, by simply lowering the cylinder extension; no pipes need to be disturbed and the cylinder head can remain in place. Another improvement was the intermediate crank-shaft below, running at half-speed to drive the valve gear. With the "Vulcanus" the links moved with the speed of the engine; on the "Sembilan" they revolved with half that speed; besides there were three links, always in tension, whereas the two links of the "Vulcanus" engines were in tension and compression alternately. The "Sembilan" runs in East Indian waters and her success induced the owners to order five more engines for larger vessels.

In February, 1912, the first marine Diesel engine built by Burmeister & Wain commenced work in the "Selandia." She is a twin-screw vessel with engines of 1000 b. h. p. each, four-cycle. By the courtesy of this concern I give a comparison of the Diesel ship "Siam" with two steamships "Kina" and "Arabien." The ships belong to the same owners. The "Kina" and "Arabien" are single screw ships 385′ 0″ between perpendiculars, 53′ 0″ beam, 26′ 10½″ draft, deadweight 8720 tons and bunker capacity, coal 770 tons. They were built in 1911 and engined with triple expansion steam engines and are the most economical steamships of the company's fleet. The Diesel engine ship "Siam" is 410′ 0″ between perpendiculars, 55′ 0″ beam, 30′ 6″ draft, deadweight 9700 tons and bunker capacity (oil) 1250 tons. The engine room force on each steamer consists of three engineers, two assistant engineers and fourteen firemen, a total of nineteen men. On the "Siam" it consists of four engineers, five assistant engineers and four oil men, a total of thirteen men.

Diesel ship "Siam," second voyage, trip around the world:

Outgoing cargo	9500- 780	or 8720 tons
Cargo between West Coast and Japan	9500-1056	or 8440 tons
Homebound cargo	9500-1215	or 8285 tons
Average cargo for whole voyage, about..		8500 tons

Steamship "Arabien," fifth voyage:

Outgoing cargo	8720-1555	or 7165 tons
Cargo between West Coast and Japan	8720-1085	or 7665 tons
Homebound cargo	8720-1120	or 7600 tons
Average cargo for round voyage, about..		7500 tons

From the engine logs of these ships the following items are of interest:

	S.S. Arabien.	M.S. Siam
Duration of voyage	300 days	226 days
Time spent at sea, engines working..	183 days	140 days
Distance in miles	45,676	34,819
Number of hours regular running	4,278	3,279
Average speed in knots	10.7	10.6
Aux. engine running, hours, P. and S.		5,204
Fuel consumption per mile, pounds..	410.8	91.5
Lubricating oil consumption per I.h.p. hour		.03 oz
Fuel consumption for firing up	66 tons	
Stand-by losses	77.5 tons	
For full steam, no propulsion	16.95 tons	
Regular propulsion	7,600.75 tons	1,357.9 tons
Maneuvering	102.5 tons	18.3 tons
Electric light	149.75 tons	22.4 tons
Heating	49.25 tons	27.5 tons
Winches and pumps	396.25 tons	18.9 tons
Fuel for main engine	7,863.7 tons	1,376.2 tons
Fuel for auxiliaries	670. tons	69.8 tons
Total fuel consumption	8,533.7 tons	1,446. tons

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Economic results for trip around the world:		
1000 tons of cargo carried one mile at a speed of 10.6 knots at fuel consumption of	55.1 lbs.	10.8 lbs.
Price of fuel per ton	$5.40	$8.60
1000 tons of cargo carried one mile at a speed of 10.6 knots at fuel expense of	13.5 cts.	4.2 cts.
Total fuel expense for round the world 35,000 mile voyage, which coincides with "Siam's" case of 8500 tons at 10.6 knots	$40,000	$12,600

The steamship "Arabien" bunkered fourteen times while the Siam bunkered only three times, and of these one was caused by a mistake in executing orders.

A saving of about 68% in fuel expenses is the practical result obtained with the Diesel engine on this voyage. This includes all consumption for loading and unloading, lighting, heating, etc. The extra saving by smaller crew, bigger cargo carrying capacity are not taken into account. The longer the non-stop voyages, the more economical the Diesel engined ships are, the only condition is that the ship may enter harbors where oil is available.

Following the "Selandia," I now have to put forward the "Eavestone." She was of 4500 tons displacement, 8200 tons deadweight capacity and 9.7 knots speed. One single-acting two-cycle Carels Diesel engine was installed, having four cylinders of 20″ bore and 36″ stroke. The power was 800 b. h. p. at 95 revolutions. She made her first long trip across the Atlantic, but on her homeward voyage had considerable trouble. New pistons and cylinder covers had to be sent to her to continue her voyage and arriving home she had to undergo heavy repairs.

Carels of Ghent and Lisences installed the following engines: Two 900 horsepower auxiliaries in the sailing ship "La France," a six-cylinder 1500 horsepower engine for the "Rolandesck," a 2000 horsepower engine for the "Wotan," the engine for the "Fordonian" and the Carels Company themselves built several engines for the British Admiralty.

I believe that the main reason for the absence of repeat orders for these engines lies in the adoption of the two-cycle principle; they must have met with too many difficulties. In the year 1912 many Diesel ships were put in commission. Aside from those mentioned, there are the "Juno" with 1000 b. h. p. Werkspoor engines and the "Emanuel Nobel" with two such engines. These engines have been repeated several times later and so are others of the same style but of different size. They represent the present day Werkspoor marine Diesel engine.

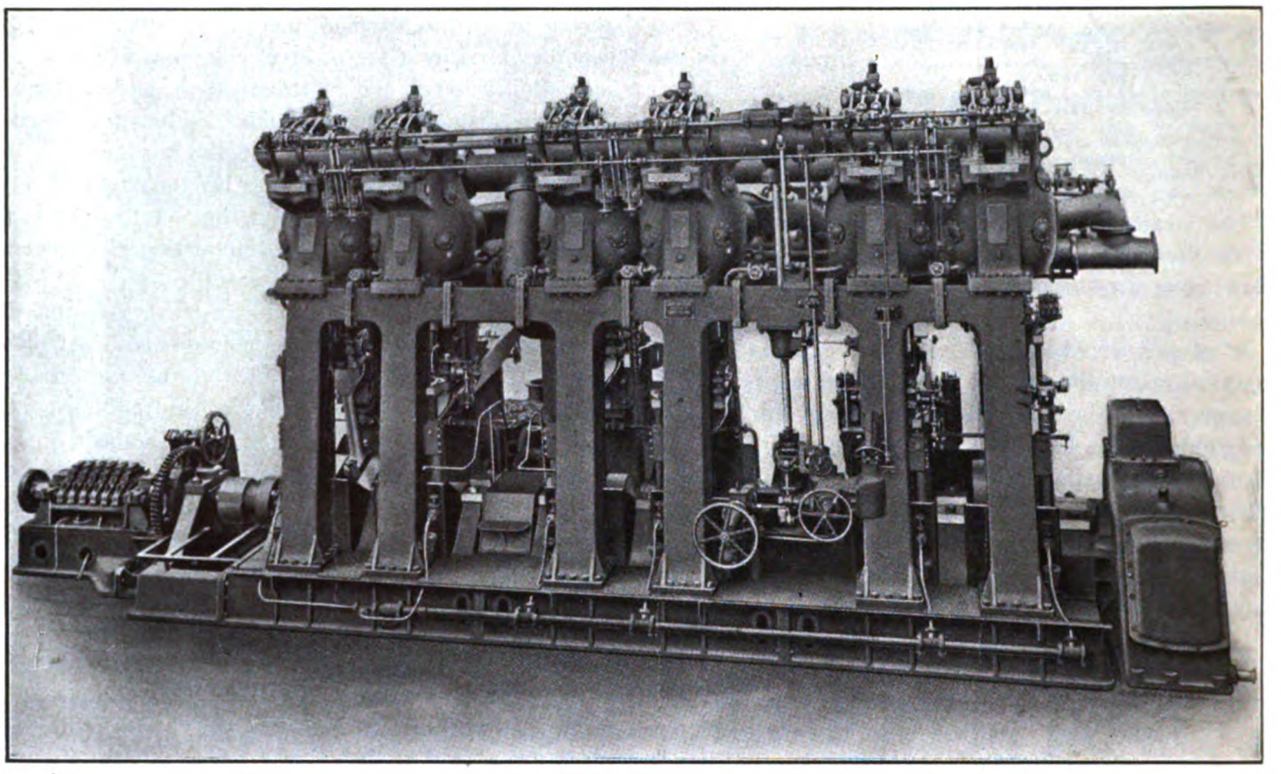
Some of the particulars may be put forward. Cylinder and cylinder head are cast in one piece. A very thorough cooling is obtained by this design, especially at the hottest parts of the cylinder and head. In the cylinder head are the customary apertures for the valves. The box-shaped piston is water cooled by sea water introduced by special telescopic pipes without glands. After circulating it is led back to the sea by another set of telescoping pipes. The cylinders are supported three by three in a cast-iron cylinder beam. The two beams are connected by an intermediate piece. The box frame has been replaced by a set of steel columns, which secure accessibility combined with strength and lightness. Cast-iron frames carry the guides. They are fastened below to the bed plate, but at the top there is no rigid connection to the cylinder beam; strips of steel prevent any horizontal motion, but vertical motions are not prevented. At each combustion the internal forces tend to elongate the steel tie-rods. If the cylinder beam were fixed to the cast iron columns the strain would go through these columns and bed plate, which parts would then require to be far heavier. Steel diagonals stiffen the engine in the horizontal direction and prevent vibration. Steel splash guards complete this part of the design. The Werkspoor patent piston dismounting device is applied, as also the floating vessel or fuel accumulator. The main improvement in this type is that the steel columns scheme is worked out more completely than in previous engines.

In 1912 Sulzer Brothers also put a set of engines in the "Monte Penedo." These are two-cycle, single-acting engines with 4 cylinders 18.5″ bore and 26.8″ stroke, running at 160 revolutions. These engines are remarkable for the absence of inlet and exhaust valves. The only valves in the cylinders are the fuel injection and air starting valves. It makes a simple cylinder head but involves complications in the cylinder wall. The exhaust takes place through openings in the cylinder walls forming one-half circle, the other half of the periphery is taken by openings for scavenging air. Of these there are two rows, one above the other and the communication between the air main and the top row of openings can be blocked by a double seated valve. This ship is probably the most successful two-cycle marine motor in service. After some trouble with the pistons (the extension required to shut the exhaust and inlet ports worked loose), the construction was altered and since then the motors have given full satisfaction. It must not be forgotten, however, that these engines were of the very best workmanship and were worked by a carefully selected set of engineers.

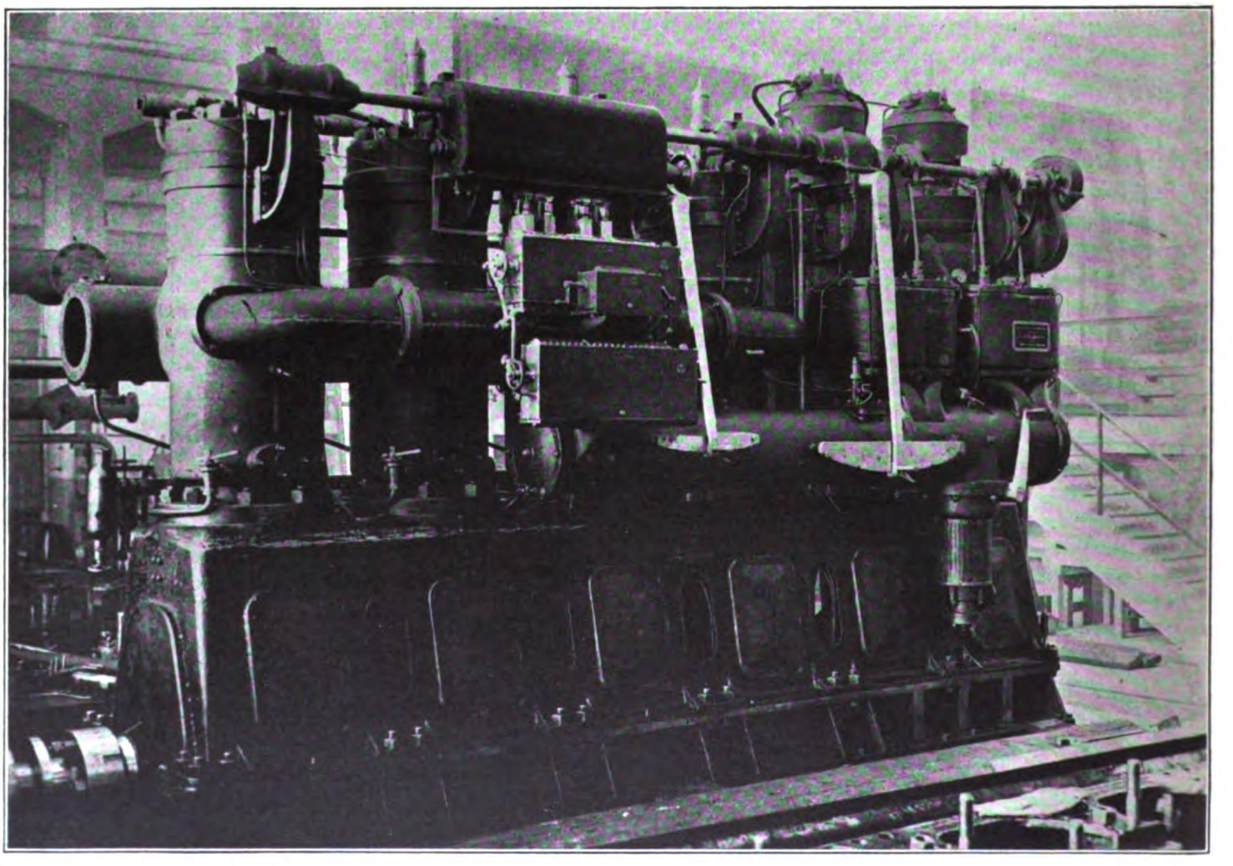
The "Arthur von Gwinner" is fitted with two four-cycle Junkers engines. The principle of the Junkers engine has many attractions. The balancing of reciprocating forces, the absence of cylinder heads and stuffing boxes are advantages of great importance, but difficulties have arisen with the cylinders and the cooling of the pistons requires very difficult details. The ship had to repair very often before her working was stopped by the war.

Some data of a very light engine built for a small Netherlands gunboat by Werkspoor of Amsterdam is here given. The power in each propeller is 600 b.h.p. at 300 revolutions; the cylinders are 15.4″ bore and 19.7″ stroke. The two engines are inclined towards the center of the ship and form a triangle. The re-

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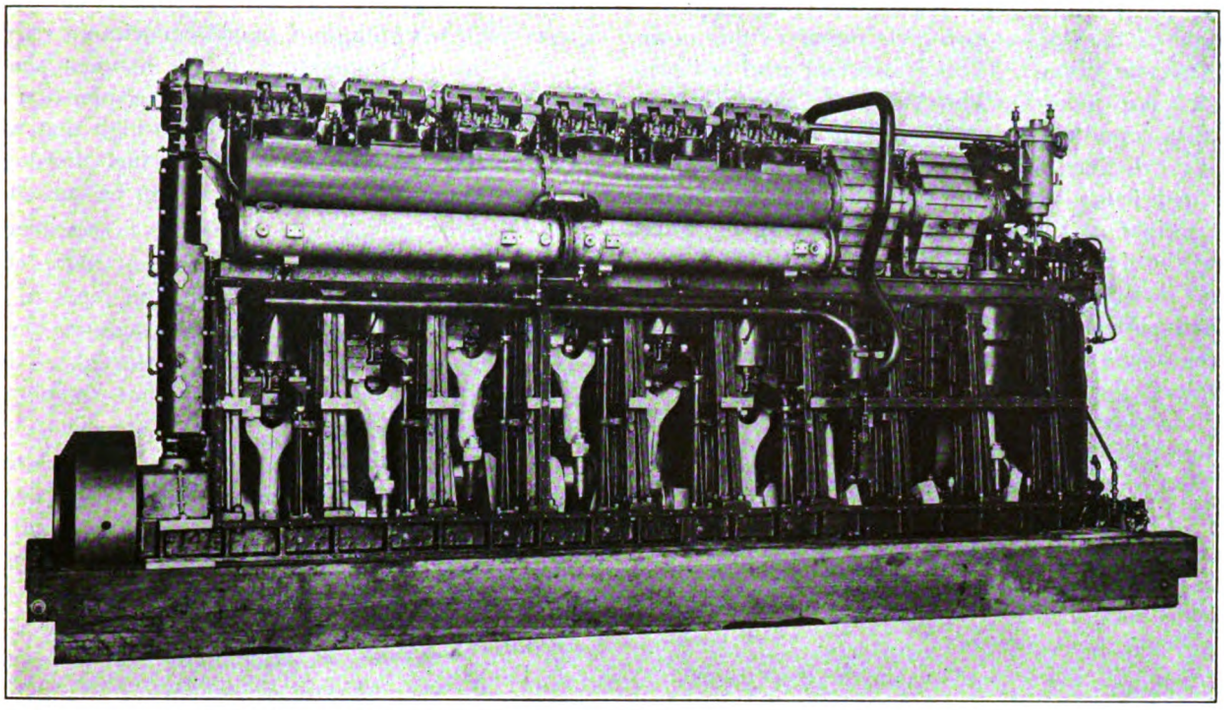


A six cylinder marine Carels-Diesel engine.

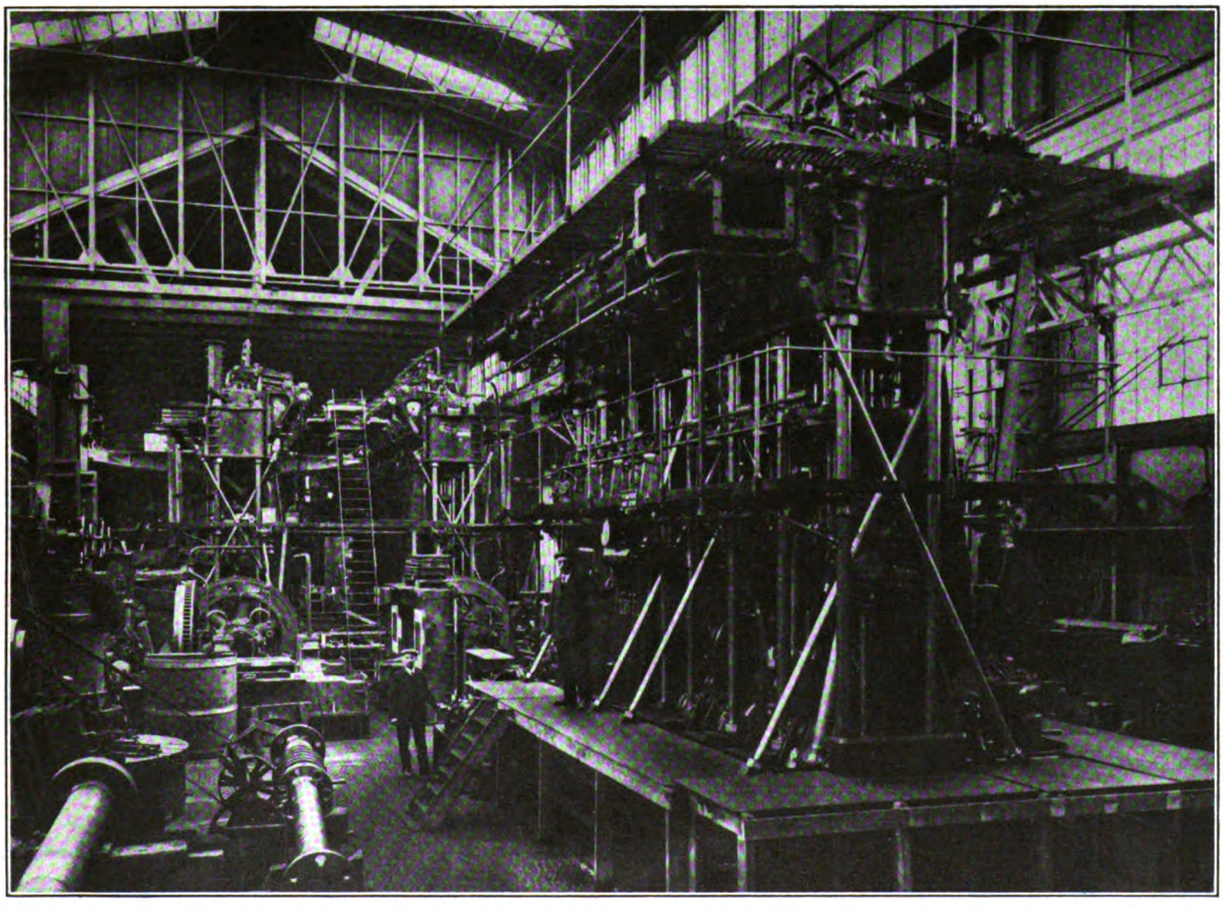


A Polar Diesel. This type of engine appears to have an exceedingly heavy frame.

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Exhaust side of New London Ship and Engine Company's Diesel of the submarine type.



Werkspoor Diesel, showing the use of light steel framing and tie rods making for strength and lightness.

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sult is an extremely stiff engine, very accessible and as light as the lightest two-cycle motor of this power at these revolutions. There is one cast steel bed plate for the two motors. This bed plate, which is very light, is connected by steel columns to the two lines of six cylinders, which are united in one block by a bolted flange over the full length of the motor. The weight of this twin motor, including fly wheel, up to the thrust bearing is 33 tons.

In May, 1914, the "Arum," with English-built, Polar-type engines made her trials. The engines are of the single-acting, two-cycle type. Each has four cylinders of 16.2" bore and 33.9" stroke, speed 135 revolutions, rated power 650 b.h.p. each. After performing various short trips, the "Arum" was sent on her first long voyage to the Persian Gulf, which was perfectly successful.

In a motor ship an important question is how to drive deck machinery and engine-room auxiliaries. When money and a good personnel is available, the best system is electricity for everything. Where fuel is expensive, this system is also the most economical in the long run. In first cost it is the dearest and a staff of engineers is required who can tackle a great many novelties at once. To save cost and dispense with novelties the best plan is to have two donkey boilers. Fire them either by coal or oil and drive everything by steam, including the air compressor required to maneuver the main motor. When the ship runs several days continuously and the motor is four-cycle, the waste gases can heat the donkey boiler, giving plenty of steam for steering. The gain is about one ton of oil per day for vessels of 6000 tons. In short runs this system can not be applied. To drive the auxiliaries by compressed air has not proven a success. In tank ships it is a good system to make the main cargo-discharging pump centrifugal and drive it by a Diesel motor. The same motor can drive the air compressor for maneuvering. This system is slightly more expensive in first cost, but, when the ship has to unload often, is cheaper in service than steam pumps.

In the first years the builders of Diesel engines prescribed the use of solar oil, a distillate of petroleum having a specific gravity of not more than .88; a flash point of 180-212 degrees F.; and a calorific value of at least 18,000 b.t.u. Most of the Diesel engines up to the present day have run on oil of approximately this composition, but gradually other heavier kinds have come in use. The only inconvenience is that the starting of the motor is not always certain, so that some shipowners prefer to use solar oil when maneuvering even if heavier oil is the usual fuel.

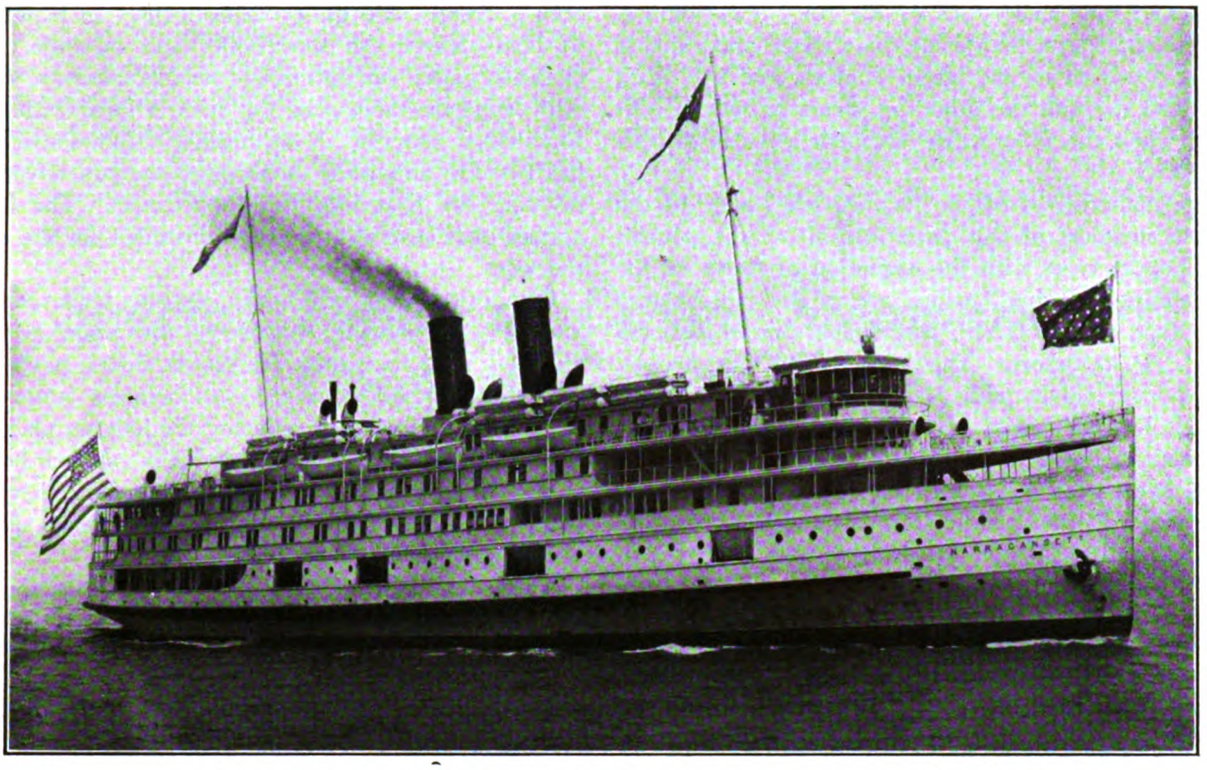
Although it was first thought that asphaltum prevents complete combustion and it was feared that it would cause deposits on the exhaust valves and the pistons, extensive tests proved that, when the motor is in good working order, the exhaust is perfectly clean and no trace of deposit is found after prolonged running. It was found possible to burn oil containing a very high percentage of asphaltum without trouble, as the cylinder temperature, at the moment the oil is introduced, is high enough to start combustion and once started, the temperature rises so high that when care is taken to mix the atomized fuel thoroughly with air, practically all kinds of oil can be burned.

For heavier oils it was necessary to construct a special sprayer, which atomizes the oil more effectively, and to heat the oil in tanks and pipes to and from the fuel pump to diminish the viscosity. On the heavier oils the motor can not be started, so it is necessary to change the motor before stopping to solar oil till the pipes and fuel pump are filled.

This is, in main, the history of the Diesel motor as applied to merchant ships at present. It has proved that this engine, if well designed, well made and well attended to, is reliable enough for the longest voyages and is at least four times more economical in fuel, weight for weight, than a coal-fired steamship, or nearly three times more economical than an oil-fired steamship. The short history has also proved, in my opinion, that it is more difficult to make a reliable two-cycle motor, under the normal sea attendance, than a four-cycle.

Probably the two-cycle motor will become cheaper than the four-cycle, although the results thus far have not shown it. The running economy of the latter is greater, especially when the waste gases are passed through a steam donkey boiler. The cost to make a good marine motor is, and will remain probably, about one-third higher than to make a good reciprocating engine of like power, but this higher price is partly compensated by the cheaper ship, because the motor takes up less room and weight than the steam engine and the bunkers can be made smaller. This latter saving depends upon the distance between the places where it is economical to fill up bunkers. The large motor ship requires fewer men than the large steamship; the quality of the men must, however, be higher. Difficulties with firemen are eliminated; but the motor, if not very well attended to, is apt to require more repair than the steamship. Balancing these good and bad qualities of motor and steamships, the fuel price in the parts of the world where the ship has to run will generally decide a choice. In special cases, however, the fuel factor will not be the main consideration, as the following qualities of the motor-driven ship are of greater value: That it does not require any warming up of boilers or engines, the motor ship can start at full speed as soon as the oil tanks are filled. That it is possible for a motor ship to bunker at very long intervals, three or four times longer than a steamship. And last, but not least, that motor ships can be made in which the part of the ship where the engines are placed is of the same temperature as the other parts of the ship. In hot climates this quality will go far to turn the balance when the engineers have a say in the decision.

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The "Narragansett," a type of steamboat familiar on America's semi-sheltered waters.

River, Lake, Bay and Sound Steamers

By ANDREW FLETCHER, Mem. S. N. A. & M. E., Hoboken, New Jersey.

COMPARATIVELY few of the river, lake, bay and sound steamers of the steamboat type are built under Classification Rules, the owners adhering largely to the constructional details of their previous steamers and, in most cases, adopting the suggestions of their architects and builders. In recent years, however, the United States Steamboat Inspection Rules have exacted the filing and acceptance of construction plans of new vessels before issuing the first inspection papers. Except in cases of large passenger boats of the Sound, Great Lakes and outside service types, single bottoms are generally used.

In recent years a greater amount of flanging, in lieu of angle bars, has been used for reverse frames, floors, intercostals, gussets and bulkheads. A system of longitudinal trussing from floors to main deck is often used in the larger types of river steamers and the comparatively shallow draft steamers of the inland lake type. The guard beams of paddle steamers are generally bracketed to the gunwale strake and secured to lodger plate. Guard braces are usually of the truss-frame type, instead of the pipe or solid round-bar construction. Sponsons, as a rule, are used only on the larger Sound steamers; in screw steamers, the shell plating acts as sponsons where guards overhang. Main deck plating is used over boilers, engine, auxiliary machinery and galley departments.

Generally a greater number of watertight bulkheads unpierced by doors are used, and a more extensive pumping system for watertight compartments is provided, with duplication of pumps on the main deck in the large steamers. A more general use is made of bitumastic compositions, instead of cement, for inside of hulls, particularly in the wake of boiler and engine compartments. Deck sheathing of cement compositions; partitions, when in hold, of light, galvanized crimped steel; galley flooring, when in hold, of steel under the tiling; and the substitution of light steel construction, wherever practical, in place of wood in hold are some of the details of construction of the later boats.

The machinery of paddle steamers varies from the old, but reliable, simple beam engine to the more modern and efficient compound and three-cylinder compound inclined and four-cylinder compound double inclined engines. The simple beam engine has great durability, low initial cost and maintenance. The paddle wheels are feathering with steel floats and the engines work in some cases at a piston speed of 650 feet. The boilers employed are of the old type of flue and return tubular boilers of 55 pounds working pressure, with long grates, high fire boxes, and simple forced draft both under and over grates.

Double poppet valves are used on simple beam engines, generally with fixed Stevens cut-off, and in some cases with adjustable Sickle's dash pot cut off,

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the length and necessities of the route determining. Double trip shafts for raising main steam and exhaust valves are used on the larger engines, one trip shaft for hand use and the other for steam as may be desired when the main valve eccentric gear is disconnected.

The main valves of the inclined machinery of the paddle steamers of this paper are all of the double-beat poppet type, with the exception of those on the "Washington Irving," which are of the box balance slide type on the H. P., and double ported slide on the L. P. cylinders. The "Seeandbee" has double-beat poppet valves with Sickle's dash pot cut off on the H. P. and Corliss valves on the L. P. cylinders. Stephenson link-gear is generally used, although the Walschaert gear is installed on the "Seeandbee" and a number of other paddle steamers and has given excellent results. Piston valves have also been extensively used.

Main air-pumps are generally worked by the main engine. The "Washington Irving" has an independent air-pump. The condensers, main auxiliaries, feed water heaters, filters, etc., are of the customary type. While jet condensers have been mostly used on the Great Lakes in combination with water purifiers, in recent years surface condensers have been largely adopted.

Many paddle steamers are fitted with trim-tanks placed on the main guards and controlled from the main engine-room. The main sanitary pump systems are fitted with the usual governing and regulating valves, the discharge-circuit pipes at the pump having removable strainers. Wrecking-pump suctions to main watertight compartments of larger steamers are fitted with foot-valves and have a charging connection to pumps.

Scotch boilers are generally used for the inclined engines, with working pressure from 130 to 180 pounds. On the latest built paddle steamers of large size, the boilers have been fitted with Howden's forced draft.

The machinery of the screw boats varies from the usual triple-expansion engine to Parsons' marine turbines. Comparatively few turbine steamers have been built in this country of the type embraced in this paper.

While Scotch boilers are most generally used for the screw steamers, water-tube boilers have been fitted to a number and with excellent results. Superheated steam has not yet been extensively used.

On later steamers, while construction of superstructures is largely of wood, steel girders and pipe stanchions are almost universally used. Engine and boiler enclosures and ventilating shafts through various decks are of steel. Deck houses in freight spaces are of steel, and it can be generally stated that in the larger modern boats, light steel construction or wood covered with galvanized iron is largely used wherever there is a possibility of fire in the motive power, crew's, freight and galley department. In a number of boats where the steel boiler and machinery enclosures, galley ventilators and heat uptakes are faced with wood on cabin side, the steel is lined with non-conducting material. The steamer "Commonwealth" has two fire bulkheads up through the superstructure dividing the boat into three fire zones. The "Seeandbee" has several fire screens installed for the same purpose.

Composite board, wall board, agasote, Nevasplit and various slow-burning substitutes for wood are extensively used for panels for cabins, doors, partitions, etc. Paneled partitions are used between staterooms on many steamers, thus reducing the lodging place for vermin. The exterior facing of the wood deck houses is exceedingly plain and, where paneled, they are practically free of moldings. In many cases sidings are smooth sheathed and canvased.

There has been within the writer's recollection but one passenger and freight all-steel superstructure and, so called, fireproof steamer built in the United States. There have been built in recent years, however, three or four single-deck ferryboats with all-steel superstructures that have given good results. But the superstructure on boats of this class is small, and neither the weight, the heat-absorbing qualities, nor the additional cost on a boat of this character would compare with an all-steel superstructure on a many-decked excursion or stateroom steamer; and even though the additional weight and higher initial cost were not considered, the writer believes that the expansion and contraction of the many-jointed sections and members, the loosening of joints due to vibration and also the difficulty of scaling and painting, would in the aggregate seriously increase the cost of maintenance and repairs. The subject of an all-steel superstructure for passenger boats is commented on, for it has been discussed very often, and while all owners, naval architects and builders should do everything possible to prevent loss of life by fire, the practical side must be considered.

The equipment for extinguishing fires is more complete on the later steamers. Sprinkler systems, while not generally used, are installed in various ways. In the writer's opinion, a system divided into a number of distinct circuits with a corresponding number of thermostatic circuits in iron conduits, connected with various annunciators in the main saloon and pump room, indicating circuit and location of fire, and having a special sprinkler pump under pressure at all times, together with a first-class fire alarm system, makes a more efficient system for a steamer than either the ordinary automatic wet-pipe or dry-pipe system. In addition to a sprinkler system, an independent four-pipe fire system, with a large number of fire valves, should be installed, particularly on large stateroom steamers. On excusion types, the better and large boats have four independent fire-pipe systems leading directly from the main pumps; such a

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system on the "Washington Irving" has about 40 fire plugs. The equipment of the modern steamer with its fire systems, as above outlined, together with a greater number of fire extinguishers, watchmen's clocks, regular crew drills, electric light wiring in iron conduits, extra dynamoes, two independent hand and steam steering gear leads, and the equipment and bulkhead and hull requirements of the United States Steamboat Inspection Rules, make possible the present high general safety of transportation on the lake, river, bay and sound steamers, as shown by the very small percentage of lives lost to the great number carried.

Special Types of Cargo Steamers for Coast-to-Coast Trade

By GEORGE W. DICKIE, Mem. Am. Soc. M. E., Mem. S. N. A. & M. E.

THE size of a steam or motor ship is determined by the length of the voyage and her proportions are governed by its nature, but her type is definitely decided by the character of her cargo.

On the coast-to-coast route there is a predominance of lumber in the East-bound cargoes and, at some seasons, partial cargoes of fresh and dried fruits and wines. The West-bound cargoes are of a general character requiring intermediate decks. The type of vessel demanded by part of the East-bound and all of the West-bound freight is not suitable for the economical transport of lumber. Compliance with the requirements of these traffics demands a compromise type possessing the useful qualities of the shelter-decker for general cargoes and the economies of the lumber steamer. It would be very difficult to improve on the American-Hawaiian freighters for the general cargo business, while our latest lumber-carrying vessels are very economical. It is a desire to combine the good qualities of both these types that has led to this attempt to combine their contending elements of design.

The inadaptability of the lumber steamer for general cargo is caused by lack of 'tween-deck spaces. Without the deck load to give them height of side, they suffer seriously from lack of freeboard. Since, when loaded, these vessels are down practically to the weather deck, they may be said to be only the bottoms of vessels with certain erections built on, and the deck load furnishes the top side and most of the surplus buoyancy.

Economy of operation makes large vessels necessary on long runs, but a large vessel of light draft is not economical and it becomes necessary to assume the taking on of a considerable load of lumber in part of the interior and part of the deck, bringing the vessel down to the available depth of water in her lumber port and then proceeding to some other port and taking on general cargo to bring her down to a draft proportional to her size. This implies that the hatches to the interior be left entirely free of any deck load, so that the second loading may be carried on without disturbing the first.

By making the lumber type of vessel deeper in the hold, adding a middle deck, carrying the hatches up through the deck load by making a continuous trunk, it is possible to accomplish some of the objects desired. Since it is inadvisable to stow lumber and general freight in the same hold, it becomes necessary to fit fore and aft bulkheads, forming a large deep central hold and two wing holds between each pair of athwartship bulkheads, the hatches for the wing holds being trunked through the deck load alongside the central trunk.

For purposes of illustration, dimensions have been assumed which will give a vessel 420 feet long between perpendiculars, 60 feet molded beam and 28 feet molded depth to main deck. This vessel would be propelled by ordinary reciprocating engines supplied with steam from Scotch boilers, the installation being about 3000 h.p. Diesel engines, or turbines with electric or gear reduction might be used, thus enabling fuel to be carried for a round voyage.

Longitudinally the cargo space is divided into four compartments, each 75 feet 10 inches long; transversely into three; and vertically into three in the wings and two in the center holds, making 28 separate cargo holds. The middle compartments would be loaded with lumber on the East-bound trips, except when the trunk is used for fresh fruit. The middle holds have hatches 50 by 14 feet in size, enabling lumber to be put into them with little or no hand labor. Each of the side holds has a hatch at the middle of its length 15 by 9 feet in size. Above the main deck trunks are built up to the height of the central trunk, so that the deck load can be stowed before the general cargo is taken aboard. Fifty-four-foot lengths can be stowed from wing hatch trunk to wing hatch trunk and timbers of any length can be stowed outside the line of the wing hatch trunks. The amount of lumber that could be carried would be 1,575,000 feet in the central hold and trunks and 800,000 feet on deck, or a total of 2,375,000 feet.

After discharging West-bound freight at San Francisco and taking on fuel for a round voyage, the vessel would proceed to some lumber port and load the lumber part of her cargo. The central holds amidships would be fitted up as deep ballast tanks

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and would hold about 1600 tons. These holds could be used to transport wine in bulk if desired. With bunkers full and deep tanks ballasted, there would be 2600 tons deadweight which would give a satisfactory condition for going north on the Pacific Coast. With 2,375,000 feet of lumber, fuel and stores, her draft would be about 16 feet 6 inches, which would be safe in the lumber ports. She would then proceed to the port where she is to load general freight. For this she would have left 16 compartments with an aggregate capacity of 5800 measurement tons. The lumber would weigh about 3562 tons and the measured cargo about 4000 tons, or a total cargo weight of 7562 tons. For the round voyage 1200 tons of fuel and 240 tons of stores would make a total deadweight of 9002 tons. The weight of the ship light would be about 4138 tons, making a total load displacement of 13,140 tons, which on 24 feet draft would give a coefficient of .76, about the right fullness for a vessel of this type on long voyages.

The double bottom for about fifteen feet from each side of the center line and from the fore peak bulkhead to the after boiler-room bulkhead, would carry the fuel oil. The double bottom would be of the ordinary cellular type, with floors on every frame and having the side longitudinals oil-tight and continuous. The center vertical keel would be tight. The wing parts of the double bottom would be used for water ballast and stabilizing.

There was a time in the history of the lumber trade when one winch at each loading point was considered proper. Forty years ago we had a hard time convincing the lumbermen that they could do this work twice as quickly if they installed two winches so arranged that one man could operate both. Now to persuade them that it is better to go back to the single winch and a single boom with but little rigging is likely to prove a very difficult task. Nevertheless, we think the method of handling both lumber and general cargo outlined below will be more effective, consume much less power and be cheaper than the methods now in use. In brief, we propose to fit two masts without rake, each serving two sets of hold groups. The masts will be 26 inches in diameter, without taper to the rigging band, which would be about 50 feet above the trunk top. The goose neck band would be about 16 feet above the trunk top. At the masts, the sides of the trunk would be carried up 12 feet for a distance of 22 feet and decked over. On the trunk deck in each end of these structures would be a steam winch so placed that the winchman could see down the hatch adjacent. There would be four horizontal cargo booms. The swing booms, of steel, built up in box sections, with a trolley inside, would be suspended from the masts by double heavy wire guys adjustable by turnbuckles. They would be about 65 feet long. The hoisting rope is fast at the outer end of the boom, passes over the outer sheave of the trolley, down around the sheave in the hoisting block, hence up and over the inner sheave of the trolley to the goose-neck, where it passes over a sheave leading it down to the axis of revolution of the boom; from this point it is led to the steam-winch drum. The entire boom and guys are to be carried by roller bearings at the rigging band. The swinging gear consists of a fixed, steel-toothed, circular rack of about 10 feet radius and 150 degrees in length, secured to solid framing on top of the winch house. A steel pinion carried by the boom and worked through suitable gearing by a four h.p. motor will engage the circular rack. For traversing the load, a wire rope will attach to the outer end of the trolley, pass under a sheave and then inboard along the boom to a drum mounted on it. A similar wire rope will attach to the inner end of the trolley, pass under a sheave at the inner end of the boom and then lead to the drum taking it from the opposite side to the first rope. This drum will be worked through suitable gearing by a 4 h.p. motor, the control for which will be brought to the hand of the winchman. Thus the winchman lifts, swings, traverses, lowers and finally deposits the load just where it is wanted.

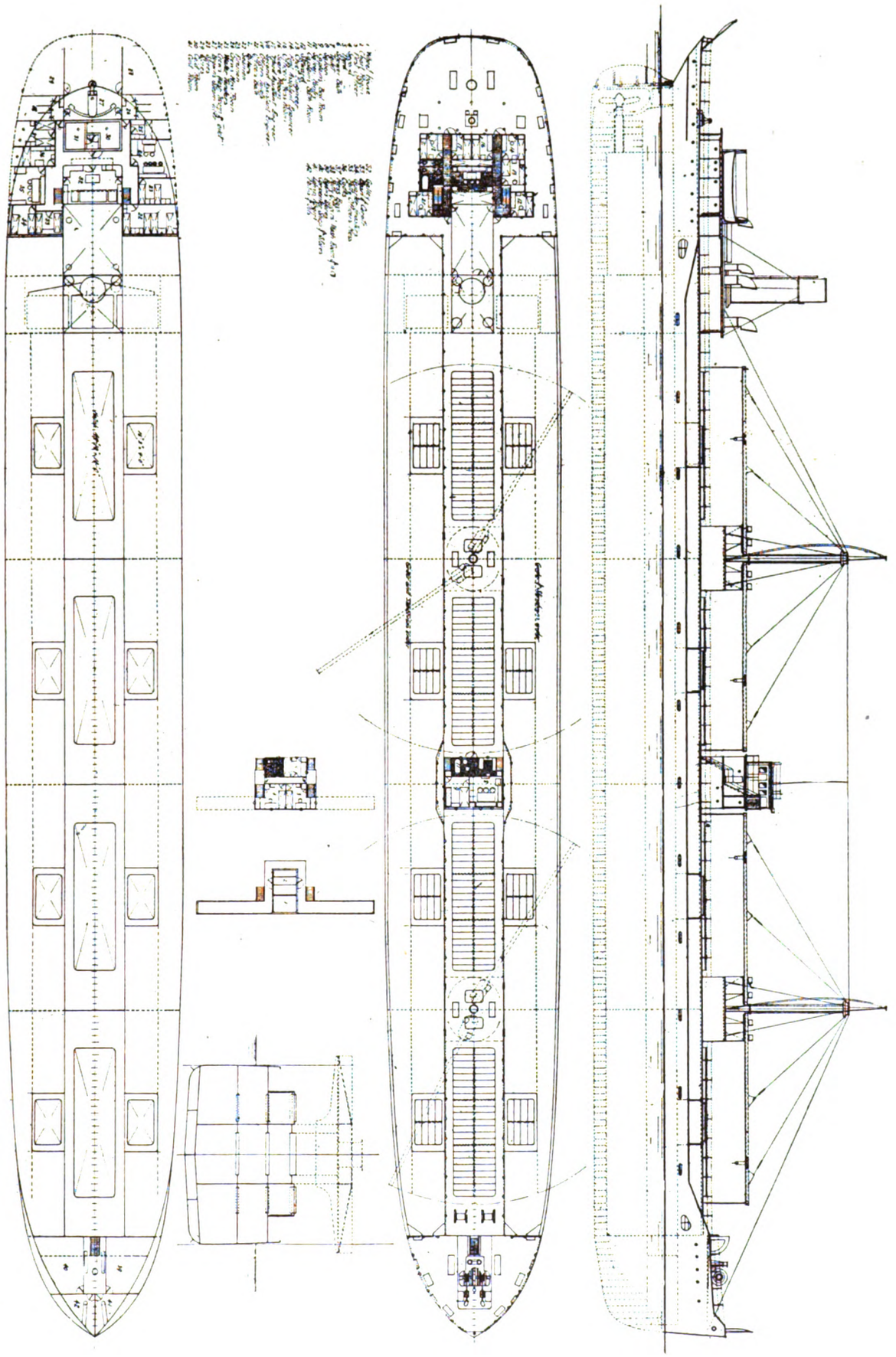
The present method, where the load is run up some 50 feet by one boom and then swung to another and by it loaded in the hold or on the dock, is spectacular and apparently fast, but it has no control of the fore and aft position of the load and necessitates much handling. The method proposed involves no more movement than is necessary to get the load into position.

When this type of vessel has loaded lumber at a lumber port and has returned, say to San Francisco, there is nothing to interfere with handling general cargo into the side holds. This type would also have the advantage of being able to deliver any considerable consignment of cargo to a port without disturbing that consigned to another.

Where it is desired to carry a full lumber cargo eastward and a full cargo of general freight on the return trip, a somewhat different type would be evolved. For a full cargo of lumber, the three holds in the breadth have many disadvantages. The longitudinal bulkheads would be moved out to the sides, forming side ballast tanks, and be so constructed as to avoid hold obstruction and at the same time carry a practically continuous girder from the outer bottom plating to the main deck. The double bottom extends between the longitudinal bulkheads and from peak to peak. Three hundred feet of the length would be used for stowing oil fuel and would carry 10,000 barrels, giving sufficient fuel for a round trip from New York to San Francisco on the assumption that geared turbines or a Diesel installation was fitted. The 5 feet between the outer skin and the longitudinal bulkheads would be reserved for water ballast and have a capacity of about 1500 tons.

The trunk would be about 30 feet wide and 8 feet high, with stiffeners on the outside. The deck load

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Proposed lumber and general freight steamer by G. W. and J. S. Dickie, to illustrate the former's paper on types of Coast to Coast freighters.

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would be carried 12 feet high and securely held down by chains rove through cast-steel corner-saddles at the corners of the deck load, and hove up with turnbuckles.

There would be 8 hatches about 46 by 10 feet in the clear; and, to facilitate stowage, the hold pillars alongside hatches would be releasable at the heels, the center row of stanchions being fixed. The lumber capacity would be 5,000,000 feet, of which 1,000,000 would be in each of four holds and 1,000,000 on deck. The under deck capacity for measured freight would be about 9000 tons.

This vessel would have the usual arrangements for handling cargo, using four masts and one derrick pole. Each hold will be loaded or unloaded from both ends of two hatches, so there will be 8 loading points, necessitating the use of 16 winches and 8 winchmen.

The arrangement described for the first type could be applied here with advantage. There would be four winches and 8 motors instead of 16 winches, and there would be 4 winchmen instead of 8. As the amount of hoisting is about 1 to 4, the amount of steam used would be about 1 to 4 and the expenditure for hoisting rope would be about 1 to 8.

Cargo Handling Methods and Appliances

By H. McL. HARDING
Formerly Consulting Engineer Department of Docks of the City of New York.

THE question, what are and what will be the cargo handling methods and appliances best adapted to the conditions of the inland and ocean ports of the United States, should be answered in such a way as to be of applicable value. To reduce the ship's detention in the harbor to the minimum; to obtain the greatest return from the marine-terminal investment in piers, quays, machinery and buildings, and yet reduce the port charges to such a low figure that they will not be a burden on commerce; to change the present methods so that the cost of transferance and of handling at terminals will not be, as it often is, more than the water carriage between the ports; these are the objects of this paper.

The high cost of the present method of handling miscellaneous cargoes and the time required to discharge and load vessels, in comparison with the results obtained at foreign ports, indicate the necessity for this study and recommendations.

There are two general classes of cargo-transferring machinery—those on the ship and those on the shore, and both are essential. There are in general two kinds of cargo to be handled, miscellaneous or package freights and homogeneous or bulk freights.

The elements of a complete marine terminal consist of piers, slips, quays, railroad tracks and various railway yards, sheds, warehouses, dray areas, open storage spaces, and often public markets, cold storage buildings, coal-pockets and manufacturing lofts. There are also sheds and warehouses for special commodities. Between each of these elements and the vessels and cars there may be at any time an interchange of freight. The following are the principal freight movements which require appliances: (a) between the ship and the open pier and the open quay and the shed or warehouse; (b) between the ship and other ships or vessels; (c) between the ship and cars; (d) between the shed and the warehouse; (e) between the ship and dray areas; (f) between the cars and terminal buildings.

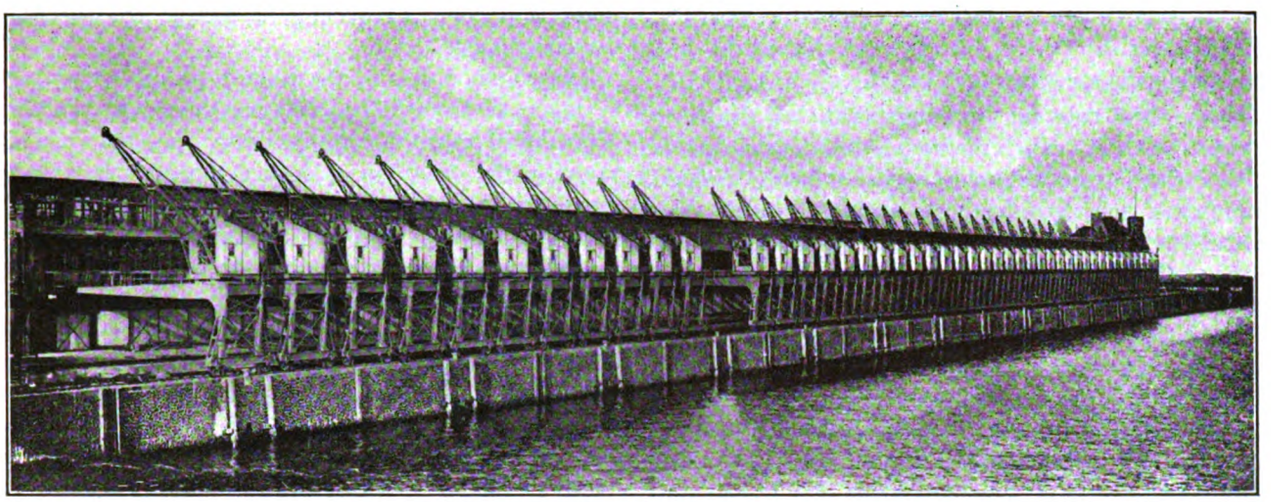
The bale, box or barrel may be between decks at some distance from the hatchway, as in the lower hold of a tramp steamer. The hook of the ship's fall rope is attached to the package and the load is drawn to and up through the hatchway above the height of the ship's rail, and is then burtoned to the hook of another fall rope, suspended from a second boom, and lowered into a space of about 8 or 10 feet radius on the side of the pier. There are two winches and operators required for these services—one on the ship and one on the quay or pier—besides the rope man. The load is then assorted, distributed and tiered by manual labor. The weight of such a draft is seldom above two tons and averages about one ton or less.

By means of the traveling gantry jib crane, at a terminal properly designed for the installation of mechanical appliances, the load is placed by one movement anywhere within a space of fifty feet radius, there being only one hoisting mechanism and one operator. This large space avoids congestion at the place of deposition.

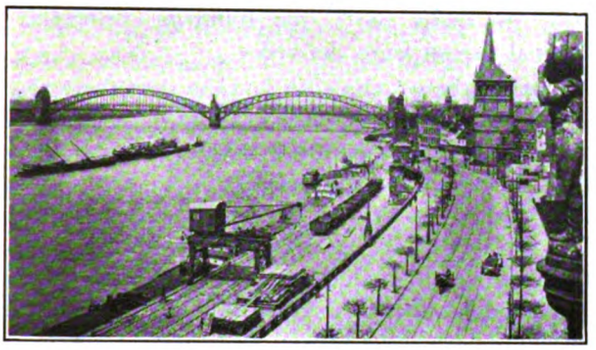
The most rapid transferring of freight between vessel and shore does not depend wholly upon transferring machinery, but also upon the design of ships. Where there can be a clear vertical lift of cargo from the hold of a ship and the elimination of the horizontal movement to reach hatchways, there can be an average saving of over 50 per cent. in the cost and in the time of transference. To secure this vertical lift, hatches have been made longer and wider and at the same time hold pillars have been largely eliminated.

For such commodities as lumber, ore or coal, special ships have been designed with almost continuous hatches to facilitate direct vertical movements. Many special handling devices have been proposed and some have been installed such as the coal bridges on the "Jupiter" and "Jason," and revolving derricks. The steam winch still remains the favorite type of cargo handling appliance. The

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Batteries of electric gantry cranes are a feature of many European port quays.



Cargo handling appliances along the quay at Dusseldorf.



Quay cranes at Antwerp.



Ore dock at Ashtabula, Ohio. These ore docks load bulk cargo with remarkable rapidity.

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derrick boom is now a steel tube of five-ton capacity, the diameter of drums has been increased to 24" and the steam pressure doubled.

The general rule for freighters is for all drafts to be burtoned. By this method, while one draft is being hoisted from the hold another is being lowered to the quay, thereby effecting a saving of nearly one-half of the time, as two drafts are in motion at once. The incease in the size of modern ships makes it imperative that on the ship or on the shore, nothing should be left undone to reduce the time of the ship's detention in port. A ship's winch will average about twenty drafts per hour. This could be increased were it not for the limited space served on the pier, generally not more than ten feet radius, and unless there is an excess of hand-truckmen, the congestion at this point is generally the limiting speed factor. Under the head of ship's machinery may be included floating cranes, barges and lighters with shear legs and various steam, electric and gasoline hoists; floating coal transporters; portable coal conveyors with suspended chutes; and mast booms with grab buckets and grain elevators.

Coastwise ships frequently load and discharge by manual labor with hand-trucks through side ports. The following figures show the expense of this method of operating as given by the Southern Pacific Company at New Orleans: "The average cost of handling for the year ending December 31, 1910, was 54.85 cents per 2000 pounds, reduced to a basis of 30 cents per hour for labor. The men are assisted by five electrically driven ramps, approximately 70 feet long and each driven by fifteen horsepower motors at a maximum speed of 225 feet per minute. In addition to taking twice as long to handle cargo, the cost of operating through overall hatches and with manual labor would be, without the use of conveyors, approximately 25 per cent. greater." This would make the cost of transferring and handling miscellaneous freight through the overall hatches 69.56 cents per ton. It is claimed by the agents of ocean liners that the cost is much less through overall hatchways than through side ports. This may be due to the time the hand-truckmen are in the ship waiting to deliver or receive a hand-truck load of about 250 to 300 pounds.

The "Antilles" discharged a load of 1725 tons in 11½ working hours, or an average of 150 tons per hour, employing 355 men. This is 70 cents per ton passing through side ports and handled by manual labor. The "Antilles" was loaded with 2831 tons in 21½ working hours, an average of 130 tons per hour employing 200 men. The maximum speed attained per hour was 150 tons discharging and 131 tons loading. In 1912, 581,172 tons were thus handled at New Orleans over 2100 lineal feet frontage, or about 276.75 tons per lineal foot. This result with manual labor shows excellent management as New York averages only about 150 tons per lineal foot. The costs given above should be compared with those given later for the traveling jib gantry and overhead traveling hoists.

The common size of the large ocean freighter may be taken as from 500 to 600 feet long and handling about 8750 tons of cargo. Every day that can be saved in the detention of such a ship may be said to represent a saving of $600.

As rehandling produces congestion, and as even a moderate amount of congestion adds 50 per cent. to the first handling costs, all designs aim to eliminate rehandling. Not many years ago there was no uniformity in the design of marine terminals. From a study of quays, piers and the machinery at foreign ports, compared with those in this country, it became evident that in order to secure the quickest movements of mixed cargoes to and from ships, the design of the whole terminal was an important factor. As a result of many reports of the federal government, of States, cities and of engineers, and of visits of the writer to many ports, the following principles of terminal design were derived:

Between the water's edge and the shed there should be a width of 35 to 45 feet of quay. To the rear of this quay space is the shed, usually one story, from 60 to 80 feet in width, from 400 to 500 feet in length and with 30 to 40 feet in the clear under girders. The warehouse 80 to 100 feet in width, 4 to 6 stories in height and equal in length to the shed is placed behind the shed 45 to 60 feet. Back of the warehouse are dray areas, open storage spaces and additional railway tracks. The space nearest the water is spanned by traveling gantry jib cranes. Freight, if of few marks, can be swung directly from the car to the hatch of the ship at a cost of about 3 cents per ton, for the mechanical movement only, and forty full drafts per hour are possible by one crane. Each draft averages about two tons in weight which would be equal to about 80 tons per hour per crane. With two cranes per hatch and four hatches, the eight cranes would have a capacity of 640 tons per hour. The total cost from the hold of the ship and tiered in the shed, using the cranes and traveling hoists, may average about 15 cents per ton. Between the shed and the warehouse high, full-arch gantry cranes will swing freight between the floor of the shed and any of the stories of the warehouse.

When goods are handled by hand, the average height of tiering is about five feet. Thus a very large floor area is required to distribute a cargo of 6000 tons according to the marks and cross marks. Assuming 60 cubic feet to the ton plus 15 per cent. for distribution gives us 70 cubic feet required per ton. Six thousand tons would therefore represent a cubical content of 420,000 cubic feet and at an average height of five feet would require 84,000 square feet of floor space. This would mean a building 500 feet in length by 168 feet in width. It is more economical to hand-truck 400 feet than to lift ten feet by hand power. By mechanical tiering,

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freight can be tiered twenty or even thirty feet high with little, if any, expense over tiering five feet. Assuming a tiering height of 15 feet, a building could be made 56 feet wide and 500 feet long and yet have a capacity of 6000 tons at 70 cubic feet to the ton. For larger freighters at ocean terminals, the length per berth could be increased to 600 feet and the width to 80 feet giving a holding capacity of about 13,700 tons. If the width of sheds can be kept within the above limits the cost will be less than is usual. It is evident that capacity is secured by height and not by width, and that the floor space inside the shed should not be occupied by railroad tracks nor used as a dray area. The railway tracks should be in front of and behind the sheds.

The function of the warehouse is to relieve the shed of cargoes which are not removed in two or three days. Each shed should have its accompanying warehouse to prevent congestion. From the warehouse, goods will be transferred to drays, cars, sheds and often to ships, barges or lighters for reshipment. As there are railway tracks between the shed and warehouse and as the tracks are depressed, the full-arch gantry can transfer goods directly between the warehouse and drays or railway cars.

It can be asserted that combinations of the traveling gantry jib cranes, the ship's winch, the overhead traveling hoists in trains, and the movable tracks and the electrical motor truck fulfill all the exacting conditions of transferring and handling package freight. There are obtained great flexibility and a large range of operations, eliminating delays, congestion and reducing employment of unskilled labor to the minimum. There is a great variation in the cost and speed of cargo transference, but with a correctly designed terminal manual labor costs can be reduced by one-half and the time of loading and discharging also by one-half.

The following are a few of the general specifications for a gantry jib crane. The half-arch crane has a horizontal limb of from 35 to 50 feet spanning two or three tracks elevated 17 to 25 feet above the rails, with a fifty foot jib and a radius of 35 to 50 feet. It lifts two tons at a speed of three to four feet per second. The slewing speed is from seven to ten feet per second. The traveling speed is about seventy feet per minute. There is a slow speed motor for each movement, preferably a direct current motor. The controling cab is placed within the jib members, so that the operator can obtain an unobstructed view of the hoisting operations.

Traveling hoist trains consist of one tractor and three or four electric hoists drawn after the tractor. All are controlled by one transferman. The speed of the train is 750 feet per minute with a six to eight-ton load. Each of the hoists has a lifting capacity of two tons at 60 to 80 feet per minute. Two traveling hoists combined can give a lifting capacity of four to six tons. The connection between the movable cross or loop track and the fixed track is by means of gliding bridges.

The number of traveling hoists is proportioned to the number and capacity of the gantry cranes so as to avoid delay or congestion. There are many types of hoisting and conveying appliances installed at marine terminals, but these, as a rule, are designed for special commodities and not for universal application. Among the more important are: Portable electric dock winches with 20 horsepower motors; stationary electric dock winches with 18 horsepower motors; floating steam hoisters; floating grain elevators; whip hoists; traveling unloaders, 5 to 10 tons capacity; elevated stationary hoisting winches; pillar-cranes; locomotive cranes; stationary bridge-cranes; lifting towers and belt conveyors, derrick booms and grab buckets; coal dumps on tipples; barrel conveyors and elevators; gravity chutes and conveyors; bag and box chutes; baggage escalators; cargo chutes; blind-hatch hoists; and stationary cranes, hammer type, of great capacity.

The Panama Canal has contracted for a coal handling plant, consisting of two duplex stocking and reclaiming bridges; six reloaders; two conveying systems; two wharf bunkers; six unloader towers which will cost erected in place $1,833,129. The unloaders will have a capacity of 1200 tons per hour and the bridge diggers and reloaders 1200 tons per hour.

In loading ships, taking Duluth as an example, the ore is brought from the mines in cars, each holding about 50 tons, and is dumped through bottom doors into the ore-dock pockets, often taking only fifteen seconds per car. From the pockets the ore runs by gravity through many hatches into a ship's hold. A vessel can be loaded with 12,000 tons of ore in an hour. For unloading cars of coal into the ships, the most efficient method consists in raising the car and by inverting dumping into the vessel. These car dumps have a capacity of 900 tons or even more per hour. For handling of phosphate rock, moving belts to the ship's side are used at some of the Atlantic terminals. Traveling and stationary cranes and the ship's winch are used for the secondary movement of the loading.

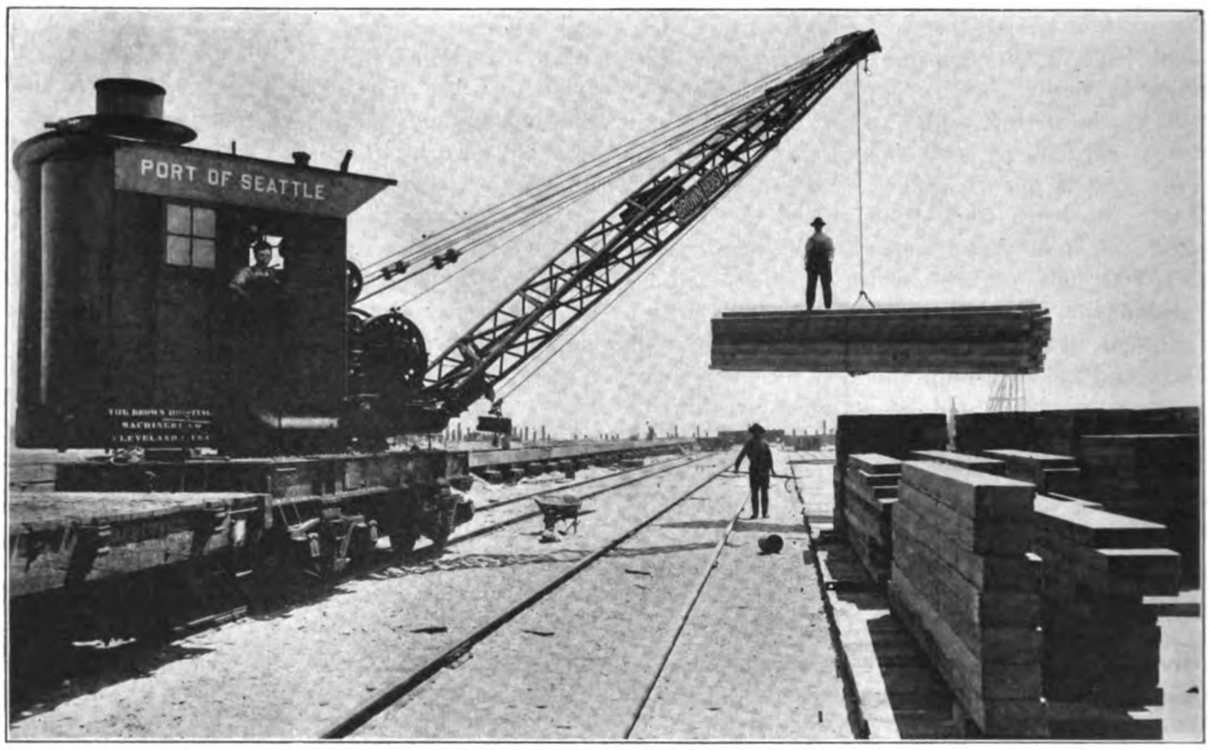
Conclusions.

(1) That on the ship there should be at least two double winches for each hatchway, and sufficient booms for burtoning the load, simultaneously, either upon the shore or lighters.

(2) That upon the quay or piers there should be traveling gantry jib cranes, one for each 100 feet of lineal frontage, spanning two or three railway tracks, which tracks are located between the shed and the quay wall.

(3) That within the shed there should be overhead movable cross tracks connecting with fixed side tracks, so as to assort and distribute the freight and to serve every cubic foot of space (tiering) by a continuous

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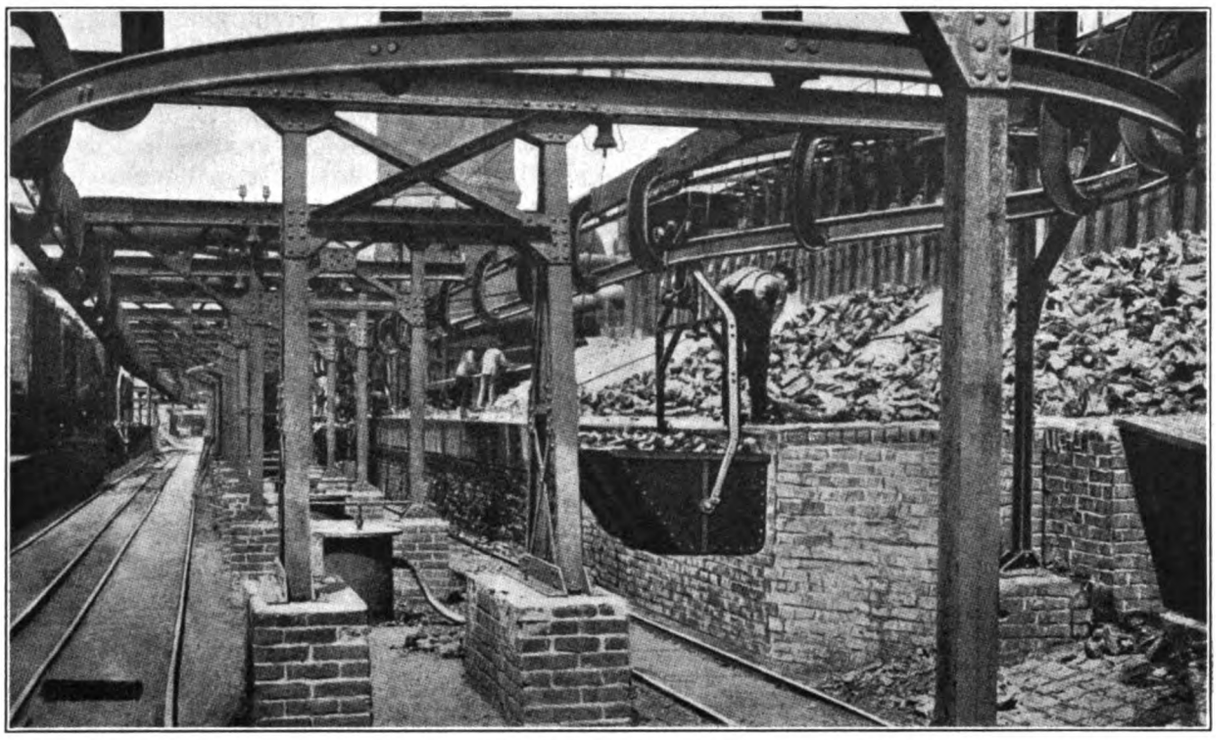


Locomotive cranes are much in use in America and for certain classes of work are unexcelled. Compare this picture, however, with the one below.

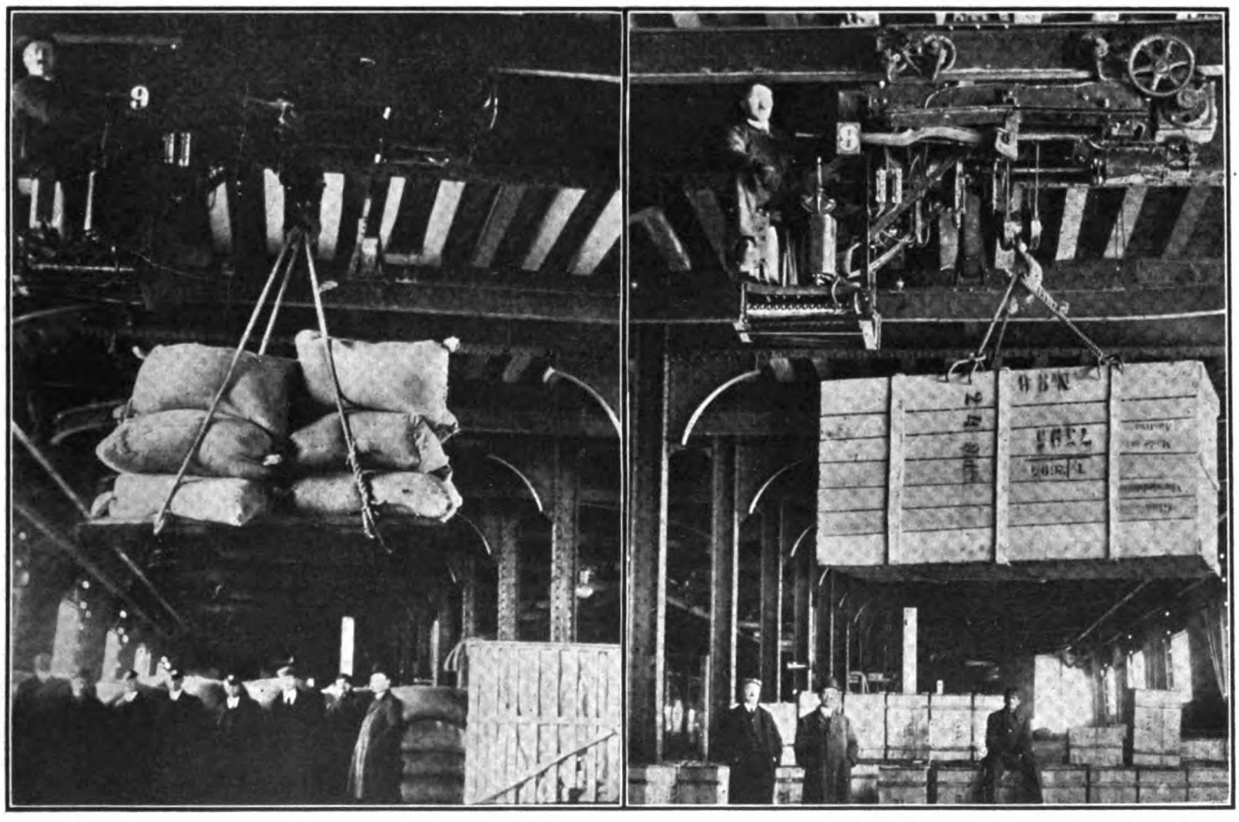


Powerful gantry cranes spanning railroad tracks and giving a wide variation of landing space, thus avoiding congestion that accompanies the use of a ship's booms and winches.

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Monorail systems are finding a wide application in the handling of many different kinds of freight.



These machines hoist, assort and distribute all kinds of package freight, either cases by hooks, bags upon flatboards, boxes in slings, parcels in nets, etc.

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succession of movements, without rehandling and not using floor space; and, also, so as to afford a short path across the shed from the vessel on one side of the pier to another vessel on the other side.

(4) That the freight should be moved without congestion or delay, by burtoning between the hooks of the gantry cranes or of the ship's winches and the hooks of the traveling hoists.

(5) That freight should be transferred between the shed and any floor of a warehouse by one direct movement of the gantry cranes.

(6) That to secure the greatest rapidity and economy in the above freight movements, the design of the ship and the plan and layout of the elements of terminals should receive careful study.

(7) That for bulk material, the mechanism should be able to reclaim as well as store, and to distribute at a considerable distance from the quay walls.

(8) That to obtain the greatest return from investments in ships and terminals, the latest mechanical appliances should be installed for speed and economy of transference and handling.

Bulk Freight Vessels of the Great Lakes

By PROFESSOR HERBERT C. SADLER, University of Michigan, Ann Arbor, Michigan.

TRANSPORTATION of bulk freight upon the Great Lakes involves several problems which are unique and which differ materially from those which obtain in similar service on the high seas. The three main staples are iron ore, grain and coal, and under normal conditions the total cargo transferred amounts to nearly 100,000,000 tons per annum, about half of which is iron ore. Owing to ice during the winter months, this freight movement must be accomplished in about six months' time. This condition has led to two important considerations as far as the vessels are concerned, viz.: a gradual increase in size, and the need of utmost dispatch in loading and unloading, so that the time in port may be reduced to a minimum. During the past ten years the size of vessels has increased from about 440 feet and 6500 tons capacity, to 600 feet long and 12,000 tons capacity.

The loading and unloading facilities have, perhaps, had more effect upon the structural design of the vessels than the amounts carried. The vessels themselves carry no appliances for handling cargo. In the early days the hand-filled bucket, operated by a steam winch from the shore, was the standard. Later came the grab-bucket, mechanically operated by means of wire ropes. This type, known as the Brown hoist, but increased in size, is still largely used. Finally there is the Hulett type designed with rigid arms. For loading, the docks are arranged with elevated bins to which chutes are attached, which can be lowered to the hatches of the vessel. A standard spacing between chutes of 12 feet has been adopted, and therefore hatches on vessels are spaced either 12 or 24 feet.

The record time for loading iron ore, in 1911, was 9362 tons in 25 minutes, but this was under exceptional circumstances. A rate of 5000 tons per hour is not unusual. The average total stay in the loading port is from 10 to 12 hours. The record for unloading, established in 1912, was 10,636 tons in 2 hours and 50 minutes. Each machine of the modern Hulett type can unload an average of from 600 to 700 tons per hour under favorable circumstances.

These methods of loading and unloading have determined four principal features in the design of the vessels. First, it is absolutely necessary to have the decks clear of house, casings, etc., in order that cargo operations may proceed with dispatch. This has led to placing the propelling machinery far aft and the pilot house as far forward as possible. Second, the hatches must be placed to suit the spacing of the loading chutes and must be as numerous as possible. Third, the depth of the vessel is governed somewhat by the height of the chutes, which must be at such an angle that the ore will flow from the bins. Fourth, the holds of the vessels should be as free as possible from obstructions.

One of the principal limitations in design is the draft of water available in the locks at the "Sault Sainte Marie" and at the "Lime Kiln Crossing" below Detroit. At present the available depth is from 19 to 20 feet, but with the new locks and improvements at the lower end of the Lakes, this will probably be increased to from 23 to 25 feet.

Length and breadth have been somewhat limited by locks, channels, harbors, etc., and at present it would appear that, from an economical standpoint, there is not much to be gained by building over 600 feet in length. It is well known that it does not pay to move bulk cargoes at high rates of speed. The economical speed for the Lakes appears to be 10 knots, consequently the vessels are made of very full form to get the maximum cargo capacity on the limited draft, and do not require more than about 2000 indicated horsepower.

The earlier types were single decked vessels with hold beams and stanchions between the hatches, and fitted with the usual double bottom which was flush plated to facilitate unloading. Web frames were also fitted between the hatches. The next development was the substitution of the "arch" construction, thus leaving the holds practically clear, except for the belt frames at the arches, which were usually fitted between each hatch. As the size of vessels increased it appeared necessary to increase the water ballast capacity and this, combined with the desire to have

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no projections in the holds, led to the adoption of the side tanks. Coal and grain, owing to their lighter density, require a much larger cubical capacity than iron ore, and hence the necessity for keeping the side tanks somewhat narrow.

Certain vessels owned by the steel companies carry nothing but iron ore, return trips being made in ballast. In this type it is advantageous to have the cargo somewhat more concentrated near the center of the vessel. By somewhat restricting the breadth of hold, the center of gravity of the cargo is higher and reduces the metacentric height, which is usually rather high in this type of vessel.

The machinery installation of these vessels has become somewhat standardized, so far as the main engines and boilers are concerned. The single-ended Scotch boiler with Howden or induced draft is now almost universally used. The tendency has been to give the vessels a slightly larger boiler capacity and to shorten the boiler length, so as to get the shell in one length of plate and do away with the middle seam. The "Sirocco" type of fan for forced draft is gradually replacing the older types with vanes, and these are sometimes turbine driven. The main engines are usually of the triple-expansion, three-cylinder type. Quadruple expansion engines are also used in some cases. The condenser is of the jet type and the air pump is driven from the main engine. This pump is now either of the Davidson or double-acting type.

Owing to the large amount of water ballast carried and the necessity of removing this rapidly, it is now customary to fit one or two large centrifugal pumps and one or two duplex plunger pumps, the latter being used to take out the last few inches of water.

Although, in general, the machinery of these vessels has become somewhat standardized, continued attention is being given to minor improvements, in order to increase its efficiency. The geared steam turbine, electric drive and oil engine have not been tried as yet, but serious consideration is being given the first of these.

PIERPONT IS SOME DISCUSSER.

Editor PACIFIC MARINE REVIEW:

Dear Sir—I have read with commendable interest your reply to the letter of Andrew Furuseth, published in your June issue. You are quite ingenious but Andrew has all the best of the argument. You assume that he will not welcome Japanese and Chinese sailors into the Sailors' Union, but in this, as usual, you are mistaken. In fact, you are mistaken so often that you must be quite used to it by this time. Is it possible that you are so dense as not to see that all this legislation will work out in favor of the shipowner. By securing Chinese or Japanese officers he will be enabled to hire splendid Oriental crews and pay no more for them than he now has to pay for a white crew. I would suggest that passengers be forced to undergo an examination as to their ability as lifeboat men or women, as to whether they know how to swim or not, and also as to their hereditary tendencies. This latter is highly important as it will give the officers a line on the expected behavior of passengers in case of accident. Would also suggest that when a ship is to strike an uncharted rock that the event be advertised so nervous passengers will stay at home and mind the cat. Panics are usually caused by the entire unexpectedness of accidents and if passengers were given notice beforehand—but why proceed. Mr. Furuseth's new law has removed all possible chances of panic. As soon as a ship strikes, her sailors will make a demand for increased allowance of butter, and if this butter is applied quickly to the boat falls everything is bound to run smoothly, much energetic profanity will be saved and the passenger will be snatched from the very jaws of a dark and dismal death by the enactments of one La Follette, who himself died in the throes of politics, having departed too far from the dictates of common sense to remain in public life. You must admit the force of this reasoning as its clearness and logic is vouched for by many who have perused its varied windings and come out alive, though crippled, at the far end, and while we refrain from citing the recent disaster to the "Lusitania" as an incident in point, had Mr. Furuseth's Seaman's Act been in effect not a single person on that gallant ship would have lost his life, and there is no doubt in my mind, and there would be no doubt in your mind, if you had one, that a crew as proposed by the Seaman's Bill would not only have saved the "Lusitania," but also the torpedo that struck her, in addition to preventing our country from being thrown into a nasty dilemma, which of course for present purposes is not what I would have preferred to use as an argument, but which, at this time, being in the public eye, has caught the attention of even lesser men than myself and there can be little doubt that it has even percolated into that last place on earth where one could expect to find any understanding—the office of the PACIFIC MARINE REVIEW, where doubtless you sit wrapped up in a cloud of hazy and fulsome ideas concerning things of which you are criminally ignorant. In the sacred names of crew desertion and more butter I ask that you give this letter publicity in order that your wretched columns shall contain a discussion on both sides of the Seaman's Act. Navigating this morning with a heavy list to port, and hoping you are the same, I remain,

Yours without much of a struggle,

PIERPONT A. HOXLEY.

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Secretary Wilson, Andrew Furuseth, Robert M. La Follette and other worthies have never hesitated or faltered when asked to reconcile the promise of the Seamen's Act with the going out of business of the Pacific Mail Steamship Company. The usual and plausible rot that is given out is that goods are not going to be carried between San Francisco and the Orient any more, but that all shipments will be made directly to and from New York; therefore the Pacific Mail, seeing the handwriting upon the wall, got out from under a tottering edifice. In other words, a trio of self-styled saviors of the sailor have set themselves up as arbiters of the trade routes of the world in addition to their former role as emancipators. Unfortunately, or rather fortunately, their words do not ring true and San Francisco is not to be deserted entirely as a starting point for ships engaged in the Oriental trades. Siochiro Asano, president of the Toyo Kisen Kaisha Steamship Company, recently made the following statement:

"Our purchase of the steamer 'Persia' was the first step in the direction of increasing our fleet. As soon as possible I expect to build two or three more liners. But these will not be ready soon enough. In the meantime the ships of the Toyo Kisen Kaisha in the South American trade—the passenger liners 'Kiko Maru' and 'Seiyo Maru'—which heretofore have touched only at San Pedro, will stop at San Francisco. It is probable that the 'Anyo Maru,' the third ship in the South American run, will be taken off that run and put in direct service between Japan and San Francisco."

Asano's statement means that the Toyo Kisen Kaisha will soon have six ships in direct service between Japan and San Francisco and two more making this city a port of call, and at the same time it brands the statements of Furuseth, Wilson and La Follette as being absolutely without foundation. There is no lack of freight on the Pacific, but there is a lack of ships to handle what is offered, and no one with the slightest pretense to any understanding at all doubts for a moment that the Japanese steamship companies are going to do everything in their power to increase the tonnage of their fleets. The one question is, will they be able to supply new tonnage fast enough to stem the rising tide of freight congestion?

PREPAREDNESS.

The doctrine of preparedness is being widely and wisely preached throughout the length and breadth of the United States to-day. Realizing the unmilitary nature of the American people and the fact that a great standing army or compulsory military service of young men, for a sufficient period to make them useful reservists, would meet with but little support, the proponents of preparedness have turned naturally to the Navy and adequate coast defenses as the cheapest and least objectionable insurance against any possible foreign invasion. However, it is recognized that to make a great Navy a really successful weapon of defense, and should the occasion arise, of offense, it is necessary to have a merchant marine containing a large number of ships suitable for transport and auxiliary service. On the Pacific Ocean what have we got in this connection?

Since the proponents of the Seamen's Act have removed the Pacific Mail fleet and made all arrangements for the removal of the "Minnesota," the list of available merchant marine suitable for long voyage transport duty is very meagre indeed. In case it became necessary to send a large body of troops to the Hawaiian or Philippine Islands and the United States was at war with a power which could dispute her supremacy at sea (thus putting the purchase of foreign ships out of the question) we would have a few old and decrepit Government transports, the vessels of the Oceanic Steamship Company and the Matson Line could be commandeered and the balance of the fleet made up of our excellent coast to coast cargo vessels. The cargo vessels, however, are not very well suited for troop ships on long ocean voyages, and by the time ships were assembled to carry an army corps and their equipment and supplies, Pacific Coast commerce would be paralyzed for lack of ships. Furthermore, with the main theater of a war on the western edge of our country and the means of manufacturing munitions all in the East, it would be doubtful if the coast to coast fleet could be spared from the task of transporting war supplies to the trouble center.

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THE COMING RACE.

From present indications there is going to be a mighty struggle for the maritime supremacy of the Pacific Ocean. The three great contesting nations for this immeasurably rich prize will be Russia, China and the United States. With China already setting afloat rumors of steamship lines and Russia quietly preparing to usurp the greatest of oceans as soon as the present European war has closed, the United States has come to feel the necessity of sharp and decisive action. From the President down to the doorkeeper of the House of Representatives there is but one topic of discussion—that of our Merchant Marine. With such a feeling permeating official Washington and with the steady and insistent demand of the entire country that something be done, there is every reason to believe that our Government will take some firm and intelligent action looking to the interests of the United States on the sea. Never have the friends of American commerce been so hopeful, indeed some of them, being carried away completely by their optimism, have gone so far as to predict that Congress will arrange for some more merchant marine commission hearings, and that by publishing these hearings in Chinese and Russian and distributing them freely through those countries our greatest maritime competitors will be effectively cowed from venturing to invade the Pacific trade routes in competition with our magnificent and rapidly growing fleets of transpacific carriers.

Of course there are a few sad-visaged individuals, call them misanthropes, knockers, soreheads or what you will, who painfully insist that it takes more than talk to build up a merchant marine: but why should we listen to the croakers? Next to banquet resolutions, Merchant Marine Hearings constitute our most powerful weapon, and if enough of them are held there can be little doubt that in the course of a hundred years or so we can talk our rivals into the ground, and of course, that means off the sea. But can we go on talking for another hundred years? Perhaps we can, we have kept it up now for sixty.

Of course some other nations have deserted the talking business and have built and operated steamers instead: but let them beware, talk is bound to win out in the end.

THOSE "SURVEYOR" BIDS.

The bids recently received at Washington for the construction of the new Coast and Geodetic Survey steamer "Surveyor," form a very interesting comparison of estimates and show that wide variations are not confined solely to private concerns. The estimates of the various Navy Yards varied from $163,250 by the Portsmouth Yard to $244,245 by the Philadelphia Yard, a variation of nearly 50 per cent. There were five Navy Yard bids submitted, the Yards estimating being those at Portsmouth, Mare Island, Norfolk, Puget Sound and Philadelphia, and the average of the five estimates was $213,836. The seven private concerns bidding for the work were the Manitowoc Shipbuilding and Dry Dock Company, Manitowoc, Wis.; the Seattle Construction and Dry Dock Company, the Anderson Steamboat Company, Seattle; the Ellicott Machine Corporation of Baltimore; the United Engineering Works of San Francisco; Pusey and Jones of Wilmington, Delaware and the Spedden Shipbuilding Company of Baltimore, and the average of these bids was $225,736 or $11,900 higher than the Navy Yard estimates. The bids of the private concerns varied forty-one per cent. from highest to lowest while the Navy Yard estimates varied nearly fifty per cent.

ESTABROOK'S VIEWS.

In the course of an address at a meeting of the American Bankers' Association at Seattle recently, Mr. Henry D. Estabrook, a prominent member of the New York bar, summarized American merchant marine conditions as follows:

"Do we wish the United States to have a merchant marine? Very well, then. How hard do we wish it? The Government cannot compel Americans to build ships—isn't that so? It can only coax and tempt and encourage them to build ships—isn't that so? The cheapest encouragement it can offer is to permit our ship-owners to compete on even terms with the ship-owners of the world—isn't that so? If that involves subsidies or their equivalent, then our Government must equalize conditions or go without its ships—isn't that so? For our Government itself to go into the business—well, that has been suggested and even urged by those who ought to know better, but the mocking laugh with which the country greeted the suggestion shows that the people still have some appreciation of the functions and limitations of government."

WHY THE PACIFIC MAIL QUIT.

Mr. Furuseth has been rather freely quoted of late to the effect that he has made a statement that the Pacific Mail Steamship Company went out of business with the sole object of discrediting the Seamen's Act. Such a statement is all right for the interior newspaper and a great many of them have swallowed hook, bait and all, but there is one little point which needs explaining and that is, if the Pacific Mail has wilfully and peevishly quit a lucrative and profitable business simply to get even with the Sailors' Union, then why does not some enterprising concern start a line of American ships in place of the Pacific Mail?

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European Marine Notes

[From our own Correspondent.]

London, September 10th, 1915.

Shipbuilding Activities.

VERY few merchant ships are now being launched in the United Kingdom, and the number consists, in fact, of vessels that were in course of construction when the Government decided to exercise greater control over the shipbuilding centers, so that more attention might be given to naval work. Contracts for new steamers are not being booked at present, except by firms that are not on the Admiralty list. Indeed, builders generally are refusing to quote prices, even for delivery a long time ahead. In consequence, Scandinavian and Japanese (and of course American) yards are enjoying unprecedented prosperity, many orders having been obtained by them from British companies. Oil interests here, I understand, are experiencing some difficulty as the result of an increasing shortage of bulk carriers, particularly as their competitors in the United States have been placing large orders there for tankers.

The British Shipping Position.

Your correspondent has frequently of late called attention to the steady rise in the price owners are prepared to pay for second-hand steamers in the belief that a period of continued high freights lies ahead. This belief is based on the knowledge that a large amount of tonnage has been permanently or temporarily put out of action. Various estimates, however, are current as to what this amount of tonnage is. The most reliable calculations are based on the figures of Lloyd's Register of the tonnage in existence on June 30, 1914. The returns show that the total number of steamers owned by all the nations was 21,889, and that the amount of gross tonnage was 40,749,559. From the outbreak of war until August 10, a period of 53 weeks, 339 vessels of 946,140 gross tons belonging to all nationalities were destroyed by act of war. These figures represent 1.5 per cent. of the number and 2.3 per cent. of the tonnage. The number of British vessels destroyed during this period was 180, of 613,705 tons; 58 steamers of 218,574 tons were destroyed down to the end of 1914, while 122 steamers of 395,131 tons have been destroyed since then. It thus appears that the number of steamers sunk has increased while the average size has been smaller. In these calculations and in all that follow only steamers of 100 tons and over are included.

Distribution of Losses.

The loss of 159 steamers of 332,435 tons has been distributed over the belligerent and neutral countries as shown below. It will be seen that Germany heads the list. Norway comes second, France third, and Sweden fourth. A writer in the London "Times" has in the following list classed these losses together.

Losses of belligerents (other than British) and neutrals:

Country.	No. of Steamers	Gross Tons.
Germany	32	104,944
Norway	29	49,211
France	11	38,112
Sweden	22	30,560
Denmark	15	27,283
Russia	17	26,503
Holland	11	22,822
Belgium	5	8,837
North America	4	6,910
Austria-Hungary	4	5,691
Italy	3	5,199
Greece	2	4,148
Turkey	2	837
Persia	1	758
Portugal	1	620

The Reduction in Tonnage.

In considering the losses suffered by each belligerent country the amount of shipping seized by the enemy in their ports and captured at sea must be taken into account. Including such vessels, the British mercantile marine has lost 269 steamers of 831,163 tons. There were, according to Lloyd's Register, 8,587 steamers of 18,892,089 tons registered in the United Kingdom on June 30 of last year, so that on this basis 3.13 per cent. of the number has been lost and 4.40 per cent. of the tonnage. Germany had 2090 steamers of 5,134,720 tons and has lost 449 steamers of 1,194,930 tons, or 21.48 per cent. of the number and 23.27 per cent. of the tonnage. Austria-Hungary owned 433 vessels of 1,052,346 tons and has lost 66 vessels of 216,074 tons, or 15.24 per cent. of the number and 20.53 per cent. of the tonnage. The amount of British tonnage seized by the enemy must also be deducted—viz, 217,458 tons. The amount of German tonnage seized is 1,089,986 tons and of Austrian 210,383, giving a total of 1,300,369 tons; but the bulk of the tonnage is now being employed by this country, and so need not be deducted from the available mercantile marine of the world. Between the figures of the German mercantile marine on June 30 last year and the amount lost or seized there is a difference of 3,939,790 tons. Some proportion of this is being employed in the Baltic trade, but the bulk of it is detained in German and neutral ports. Similarly the Austro-Hungarian fleet has 836,272 tons out of action. If we estimate the number of steamers requisitioned for Government work and so out of the market at about 3,000,000 tons all these deductions serve to reduce the world's avail-

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able tonnage to 31,809,899 tons, or 78 per cent. of the tonnage in service last summer.

British Increase Last Year.

Nothing perhaps is more striking than the figures of Lloyd's Register, showing that the number of British steamers on June 30 last was actually greater than that of a year ago by 88 steamers and that the tonnage increased by 343,616 tons. Shipowners remember, however, that during the first few months of the war mercantile building was not interrupted by Government work to anything like the same extent as during the past few months, and they cannot expect building for the remaining months of this year to be continued on the same scale as in the latter part of last year. As regards finance, it may probably be said that, taking as a whole all the shipping clubs which have been working the Government scheme of insurance of hulls, premiums have practically equalized claims. The cost of insurance works out only at about 6 per cent. per annum. Owing to the rise in the value of shipping, the actual payments are now heavier in comparison than during the first few months of the war. This, however, should be offset by the fact that owners are paying insurance premiums on larger values.

Britain Wants More Ships.

The Government have under consideration, I hear, the question of providing more vessels for the trade of British overseas dominions. Sir Robert Borden, the Canadian Prime Minister, is concerned about the lack of facilities for the transport to Europe of the new grain crop—a record one there is good reason to believe—while, though for some months Australia has been employing the Austro-German steamers that were interned in Commonwealth ports on the outbreak of hostilities, there are not enough of these to cover traffic requirements and to meet the increasing competition of the Japanese on the transpacific routes. Our West Indian colonies, and notably Jamaica, also have been suffering severely owing to the shortage of tonnage, especially as a great part of their exports are perishable products, such as bananas and other kinds of fruit. Newfoundland, likewise, is feeling the effect of the situation, for there are not now more than three small cargo boats running regularly between St. John's and Liverpool. Apart from the probability that a number of vessels will be released from war service, the scheme most favored in this connection is a modified system of State control, with compensation for loss as the result of interference with regular trades.

Dearer Merchant Ships.

Two months ago it was thought that the price of second-hand steam tonnage had reached the maximum, but since then values have increased considerably, with every likelihood of a further advance. With a smaller choice of boats to select from, and the concentration of the country's shipbuilding resources on naval work, only those firms in urgent need of steamers will be able to meet their requirements. An example of the upward tendency is told me in the case of a "liner," condemned by a Prize Court, and sold here in January for $326,000, which has just been bought by a colonial company for $600,000, and it is said that the buyers already have refused a profit on their bargain. There is, however, an insistent demand for steamers for the transpacific routes, particularly in view of the increasing Japanese competition, and great efforts are being made by the British steamship lines running there to maintain their services as efficiently as possible.

AMERICAN ASSOCIATION OF PORT AUTHORITIES.

The American Association of Port Authorities held its fourth annual meeting at Los Angeles Sept. 13th to 15th. President Oscar F. Lockey of Baltimore being unable to attend, J. P. Gilmer of the Los Angeles Board of Harbor Commissioners, was chosen chairman of the convention. The following papers were read:

Recent Port and Railroad Developments in Philadelphia, by John Meigs, Director Dept. of Wharves, Docks and Ferries, Philadelphia.

Port Terminal Development—A discussion of fundamental problems, by Paul Page Whitham, Consulting Civil Engineer, Seattle.

Public Control of Our Water Front and the Obstacles to be Overcome, by Ed. F. McSweeney, chairman Board of Directors Port of Boston.

Free Ports, by Calvin Tomkins, Ex-Commissioner of Docks, New York City.

Assessing of Scientific Port Charges and Basis of Method of Such Charges, by Ernest M. Loeb, President Board of Harbor Commissioners, Port of New Orleans.

The Best Methods for the Development of Port Traffic and the Attraction of Port Business, by Dr. J. P. Gilmer, Commissioner Board of Harbor Commissioners, Los Angeles, California.

On the third and concluding day a very interesting discussion of the papers took place. Mr. J. J. Dwyer, chairman of the San Francisco Board of Harbor Commissioners, was elected President of the Association for the ensuing year, and Montreal was selected as the meeting place of the 1916 convention.

The report of the Resolutions Committee, which was approved by the Association, should be classed as a piece of really constructive work. By this action ten subjects involving problems of great interest to Port Authorities and all those interested in port matters throughout America were assigned to committeemen for investigation and study during the year. The purpose in mind,

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being that at the next annual meeting the results of these studies will be brought before the Association in the form of papers and reports, thus assisting in the development and ultimate adoption by the Association of general rules and policies relating to port matters and the adoption of a campaign of action in regard to matters requiring such attention.

The Los Angeles Board of Harbor Commissioners, Dr. J. P. Gilmer, Chairman of the Convention, and Los Angeles people generally made good on their reputation of boundless hospitality. The visiting delegates were shown over the harbor and every one and all were much impressed with the magnitude and the splendid quality of the improvements which are indeed a monument to the energy and public spirit of the people of Los Angeles.

Among those attending the convention were W. G. Ross, Frank Power, Col. O. P. Lobell, and Mr. M. W. Fennell of Montreal, J. D. Carey of Cleveland, John Meigs of Philadelphia, Ben Thomson of Tampa, H. Phillans of Mobile, F. W. Mulkey of Portland, Ore., Paul Whitham of Seattle, Dr. J. P. Gilmer and C. H. Matson of Los Angeles, and T. F. Williams of San Francisco.



Launch of the "Annette Rolph" at the Union Iron Works, September 4, 1915.

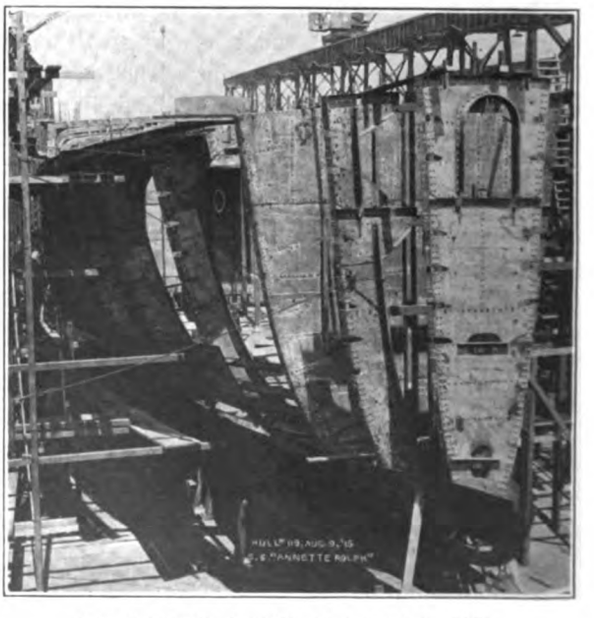
Shipbuilding Boom Reaches San Francisco

THE launch of the "Annette Rolph" on September 4, followed by the launch of her sister-ship the "Eurania" on September 11, coupled with the keel laying of two large Union Oil and one large Standard Oil tanker, and the construction of a large gold dredger, marks the beginning of what promises to be a long period of shipbuilding activity at the Union Iron Works.

The construction of the "Eurania" marks the first time a large vessel has been built on this Coast on speculation, and there is little doubt that the vessel will be favorably disposed of before she is completed, if she is not, indeed, already sold. The "Annette Rolph" and the "Eurania" are 400 feet in length between perpendiculars, 56′ 0″ molded beam, 32′ 0″ molded depth, 9′ 0″ between decks and have a deadweight capacity of 9000 tons on 25′ 9″ draft.

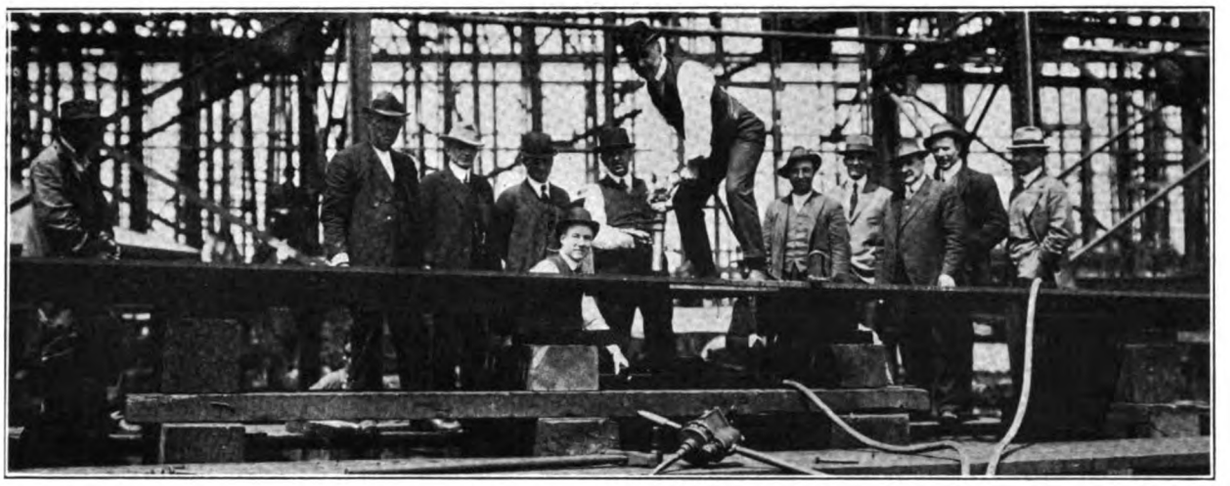
These two fine general cargo boats will be the first vessels built here with reduction geared turbo drives and the undoubted economy when demontrated to Pacific Coast steamship owners at first hand will undoubtedly lead more new vessels to follow in the use of reduction gear drives. Steam is supplied by three single ended Scotch boilers at 200 pounds and is passed through General Electric-Curtis turbines running at 3500 revolutions per minute. The reducing gears are of the Westinghouse type, double reduction gears being employed to bring down the revolutions from 3500 for the turbine to 90 for the propeller-shaft. The shaft horse-power of the main drive will be 2400 and a speed of 10½ knots is expected.

In launching these two boats within eleven weeks of the laying of their keels, the Union Iron Works has set a smart record for speed in hull work.

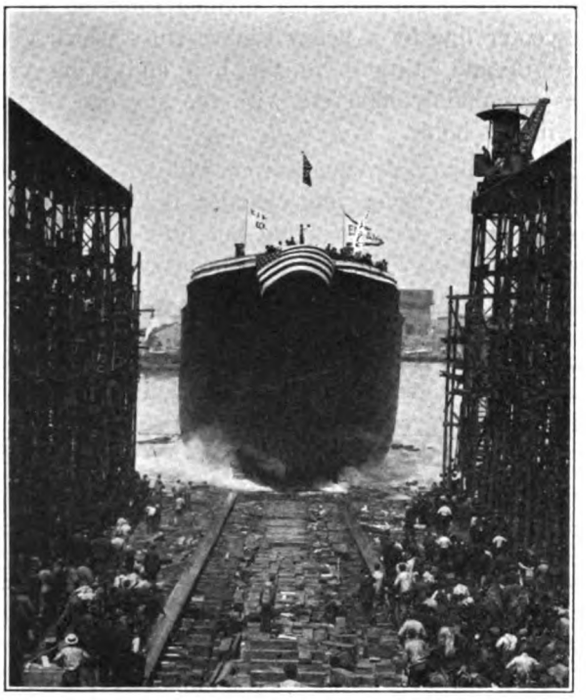


The "Annette Rolph" on August 9, 1915.

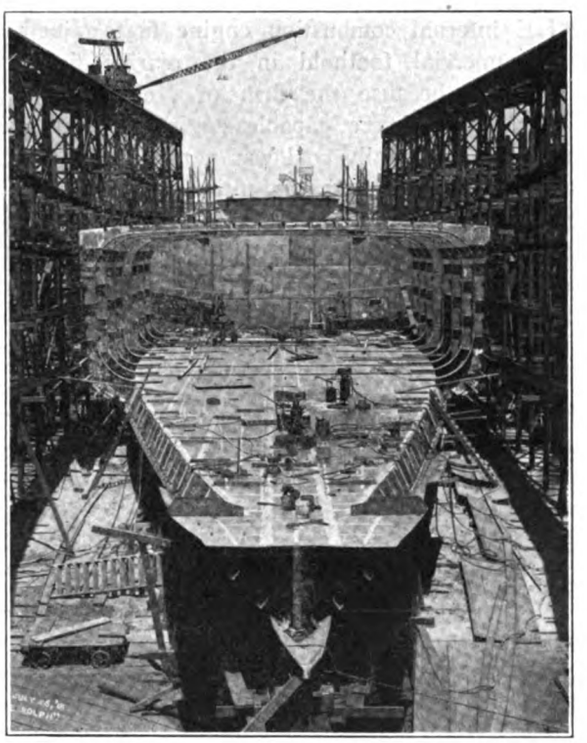
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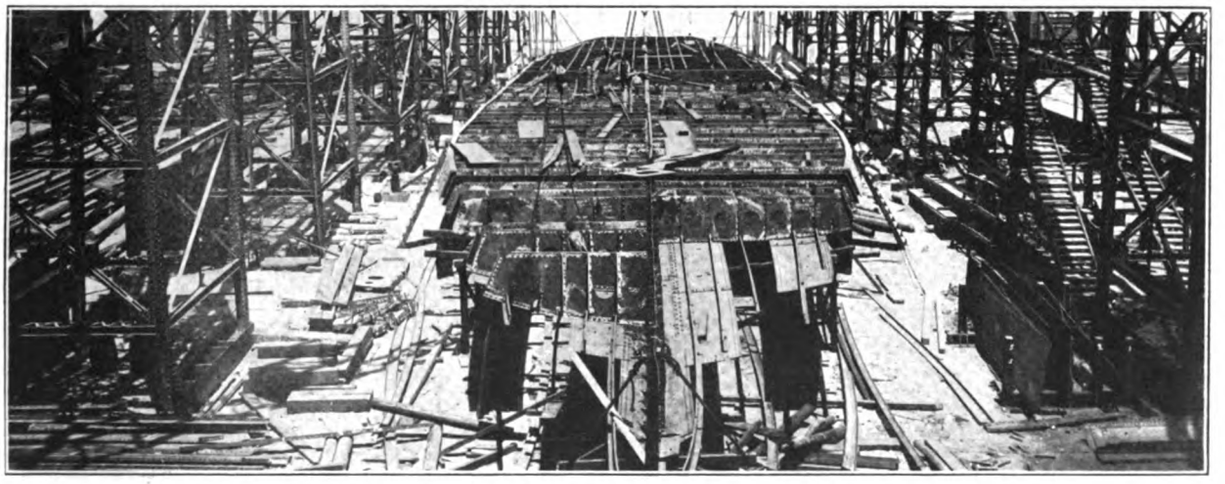
Driving the first rivet, "Annette Rolph," June 1, 1915. James Rolph, Jr., riveter; J. A. McGregor, holder on; and Timothy Reardon, rivet heater.



Launch of the S.S. "Eurania" at the Union Iron Works, September 11, 1915.



Progress view of the "Annette Rolph," July 26, 1915.



Progress view of the "Annette Rolph," June 21, 1915.

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The waterfront at St. Helens, showing steam and sailing lumber schooners.

A Large Bolinder Auxiliary Now Building

THE internal combustion engine first gained a commercial foothold in the marine field in Russia because the firm of Noble Brothers owned oil wells, were capable engineers, had machine shops, and finally coal was very high in price. This combination lent the incentive to this firm to undertake the exploitation of the internal combustion engine for their own benefit. Fuel oil is cheap and coal is high on the Pacific Coast, and while this is the ideal natural condition for encouraging the use of internal combustion engines, the advance in the use of such machines has been very slow.

The first large-sized semi-Diesel installation for a vessel on the Pacific Coast is to be in a lumber carrying vessel now building for the Charles R. McCormick Company at their own yards at St. Helens, Oregon. This craft is 278′ 0″ long over all, 250′ 0″ between perpendiculars, 48′ 0″ beam and 19′ 0″ depth of hold, being probably the largest single decker wooden vessel yet constructed. The rated lumber carrying capacity will be 2,000,000 feet. The craft will be rigged as a five-masted sailing schooner with cargo booms on two of the masts serving two large hatches. Cargo handling facilities will be similar to the usual steam schooner outfit, steam for the winches being supplied from an oil fired donkey boiler. The main holds are divided fore and aft on the center line by a heavy timber truss which gives strength and stiffness to the hull and being open does not unduly interfere with the stowage of timber in the holds.

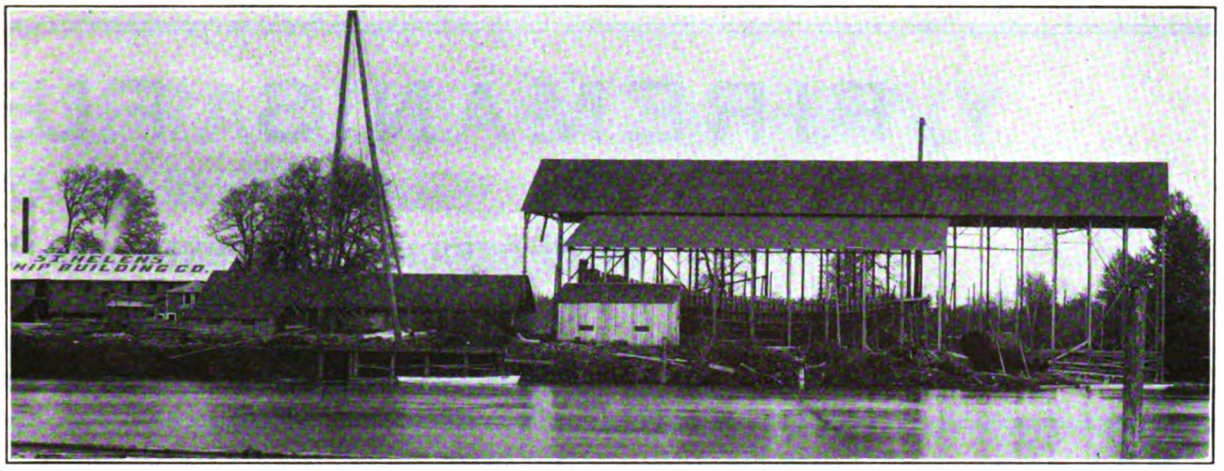
The auxiliary driving power will be supplied by two 320 horsepower four-cylinder Bolinder engines, placed far aft and occupying but little space of any use for cargo. The guaranteed consumption of fuel on these engines is .58 pounds of fuel per horsepower hour, and judging from past Bolinder performances no difficulty will be met with in meeting this guarantee. Under power this new lumber carrier is expected to develop about seven knots loaded, and her performance on long off-shore runs will be keenly watched.

The pictures shown herewith represent the St. Helens Shipbuilding plant, which, during the past three years, has turned out five large wooden hulls in addition to a large number of barges, lighters, dredger hulls, etc. The success met with here in building large wooden vessels is chiefly due to the presence of fine ship timber of almost unlimited length. The Charles R. McCormick Company own large tracts of fine timber and are enabled to select the very best stock for use in their own shipyard,



St. Helens Shipbuilding Company's plant, a part of the shipyard.

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The building slips at the St. Helens yard.

the result being especially staunch hulls. These wooden vessels cost about half what a steel hull does and the McCormicks are hopeful of results from their new auxiliary lumber carrier on long voyages, such as Australia or Europe, that will lead them to build a large fleet of similar vessels.

The advantages of auxiliary powered vessels in the lumber trade of the Pacific Coast have been discussed pro and con for several years, and it is greatly to the credit of the Charles R. McCormick Company that they should launch out on a new venture and carry the matter out in such a thorough manner, furnishing a large enough vessel with sufficient auxiliary power to make the data obtained from the results authentic and worth while.

The steam collier "Franklin," of the rapidly growing Coastwise Transportation Company's fleet, was launched at the New York Shipbuilding Company's plant August 21. She is the seventh collier built at Camden for the same firm, and there are seven more under contract. The "Franklin" will be used for transporting coal from Virginia to Mediterranean ports and unusually large coal bunkers have been fitted, enabling her to make the round trip without rebunkering. As the return voyage across the Atlantic is to be made in ballast usually, very large deep tanks have been fitted which, with the double bottom and peak tanks, provide ample room for water ballast. Officers and crew are comfortably berthed amidships and aft. The general dimensions are 395′ by 55′ by 34′ 6″, and the designed load draught is 26′ 6″. The engine installation is of 2000 horsepower and a speed of 11 knots at sea is expected.

The Ward Line, which recently ordered a steamer from the Seattle Construction and Dry Dock Company, has followed the initial contract with one for a second boat. It appears that all the larger yards on the Pacific Coast will soon be running full blast.

Christhoffer Hannevig of Christiania, Norway, has ordered two triple screw, steel oil tankers from the Baltimore Dry Docks and Shipbuilding Company. These vessels will be 293′ by 47′ by 28′ in size and will be each equipped with three Bolinder engines.

The sale of the Pacific Mail Liner "Persia" to the Toyo Kisen Kaisha marks the beginning of a great expansion on the part of the Japanese line. This company, with characteristic energy and foresight, is planning far into the future and the splendid future of Japanese shipping on the Pacific Ocean seems to be well assured.

A contract has been closed between the Interisland Navigation Company and C. W. Hunt of New York, for the construction in Honolulu harbor of a 165,000 ton coaling plant. The investment will be about $1,000,000.

The $1,500,000 shipyard to be erected on the site of the old Roach yard will be known as the Chester Shipbuilding Company.



Launch of the Collier "Franklin." Photo New York Shipbuilding Company.

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Freight Report

By PAGE BROTHERS.

Our last review was dated 20th of August, and freights, since that period, have reached lower levels, not alone on this Coast, but on the New York side, as well as in other parts of the world, due to two causes, first, that this period is what might be called a transition period, between crops, or before the crops come in in any quantity to shipping points, and secondly, to the terrific fall in exchange, which has checked business all over the world. From now on, however, we look for rates certainly not to be lower, and more probably to be higher, and in greater demand.

Balfour, Guthrie & Co. chartered the Japanese steamer "Hokoku Maru" at 92/6 for U. K. from San Francisco, with the option of general cargo, and option of loading North as well, at the same rate of freight. Westrope & Co. chartered steamer "Torridge" on private terms, for barley from this port to U. K. G. W. McNear & Co. chartered steamer "Henrik" on private terms, to Scandinavia. She has now been put on the berth by them, for October loading, as well as steamer "Bravo," in the same direction. Hind, Rolph & Co. paid 85/- for the sailer "Bourbaki" for U. K.

From the North, Grace & Co. sold a cargo of wheat by their time chartered steamer "Aztec" to Melbourne, and probably this will be the last cargo of wheat to Australia, as the prospects for the new crop of wheat are said to be magnificent, and in proof of this, the Australian Government has canceled, for a consideration, two cargoes of hay, previously bought by them, and which were to be loaded on the steamers "Bia" and "Queen Maud." M. H. Houser chartered steamer "Beckenham" at 95/- for U. K. from Portland, with the option of one or two ports between Callao and Valparaiso, inclusive, at 50/-, and the steamer has since been ordered to the West Coast of South America. The American ship "Dirigo" was chartered by G. W. McNear to carry a full cargo of barley from Puget Sound to Scandinavia, and M. H. Houser chartered steamer "Navajo" from Seattle and Portland, with a full cargo of barley to U. K. on a net basis of about 92/6, less the usual commissions. Kerr, Gifford & Co. chartered steamer "Esslingen" at 92/6 to U. K., and Balfour, Guthrie & Co. chartered the sailer "Medway" from Portland to U. K. at 75/-.

Lumber freights have also felt the check in business. The West Coast of South America has been especially backward in chartering. Outside of business done through W. R. Grace & Co.'s steamers, only two sailers have been chartered since July, namely, the "S. G. Wilder," lumber to a direct port in Chile at 85/- by the Mohns Commercial Co., and the "William Olsen," by Balfour, Guthrie & Co., to Payta, Peru, supposed to be at the same rate of freight.

To Australia, business has been more active. Stimson Mill Co. chartered sailer "J. W. Clise," from Puget Sound to Melbourne at 107/- per thousand. J. J. Moore & Co. took the "Georgina" from Columbia River to Melbourne on private terms. The Charles Nelson Co. took the "J. H. Bruce" to Sydney at 95/-. Schwager, Nettleton Co. the "E. R. Sterling" from Puget Sound to Sydney or Melbourne on private terms. It is understood they have sold a cargo to the British Government. G. W. McNear loads steamer "Bia" and "Queen Maud," as mentioned above, with mixed cargoes, from here and the North to Sydney/Adelaide Range. Port Blakeley Mill Co. sold cargo of lumber by their schooner "Bainbridge" to the Australian government on a basis of 105/- freight to Melbourne. The American Trading Co. chartered "Wilbert L. Smith" from Gray's Harbor to Fremantle at 115/-. Comyn, Mackall & Co., the schooner "W. F. Jewett" from Humboldt Bay to Sydney at 85/-, for loading February-March, 1916. Hind, Rolph & Co. chartered the "A. B. Johnson" from Gray's Harbor to New Zealand at about 85/- to 87/6.

The first charter drawn for Africa since the 20th

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ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK
AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

of May, was made by Heatley & Co., London, they having chartered the schooner "H. K. Hall" at 145/- per thousand, from British Columbia to a direct port in Africa. The British Admiralty took steamer "Holtye" to load cargo of lumber from Puget Sound to a direct port in United Kingdom, rate private.

Frank Waterhouse & Co. have the distinction of chartering most of the steamers fixed on time charter to the Orient, namely, the Japanese steamer "Kurohime Maru," from Puget Sound to Vladivostok, relet from Mitsui & Co. on private terms, and "Kaifuka Maru" at 10/-, delivery Honolulu, and redelivery via Vladivostok to Japan; also "Kenkon Maru No. 3" at about 11/-, delivery and redelivery Japan, for one round trip to the Pacific Coast.

Since our last report, the Pacific Mail Steamship Co. sold the steamers which were on the line from this Coast to China and Japan. The prices named were $5,250,000 for the bunch, and the declaration is being made that all these steamers will be sent from this port to London, direct. "Korea" is ready to proceed now with about 6600 tons of cargo, and the "Siberia" will follow next (in about a week) and should sufficient freight not offer for London direct, it is quite possible that these steamers may also go from here to New York, and then fill up there, where there is really more demand, as most of the freight from here to London had been practically arranged by Balfour, Guthrie & Co. for the Harrison liners long before the purchase of the above steamers. The influx of these steamers offering in the market for general cargo, had the effect of breaking the rates on barley from about 92/6 to 85/-, but as we said before, we expect rates to be better from this time on.

In anticipation of high freights from this Coast, the rate of freight on Government coal from Norfolk, Va., to this coast, has suddenly diminished. On the 8th of July, the Government was paying $5.25 for steamers with coal, and the last charters made by them have been $4.25 for a port between San Diego and Seattle, inclusive, and $4.20 to San Francisco. These rates are, of course, free of stevedoring to the ship.

THE "AUSTRALIEN."

The latest big motor-ship to be delivered to her owners is the "Australien," which held its trial trip on Copenhagen Sound on August 12. This vessel is a sister-ship to the "Malakka," "Tongking," and "Panama" of the East Asiatic Company's fleet. She is 410′ 0″ long, 55′ 0″ beam, 30′ 6″ molded depth and 9200 tons deadweight capacity.

The "Australien" is fitted with two 6-cylinder main Diesel engines of the single acting, four-stroke, forced lubrication type. The motors develop in total 3100 IHP. at 125 revolutions. The contract speed fully loaded is 11¼ knots.

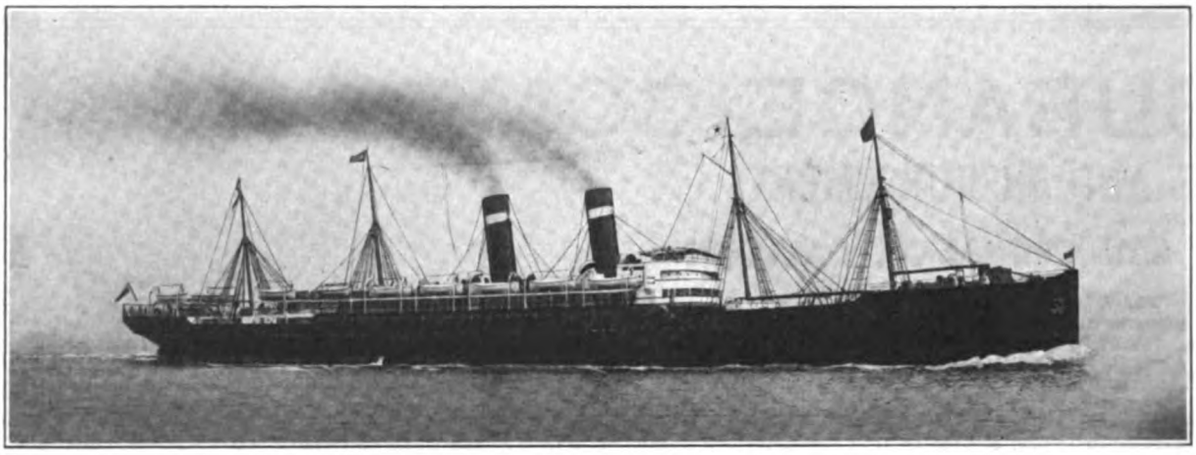
Each of the main engines is fitted with one main compressor for air injection and with six fuel oil pumps, one for each cylinder, but aside from these the engines are free of all pumps. All auxiliary machinery, winches, anchor windlasses and steering gear are electrically driven. For this purpose there are three auxiliary Diesel engines each of 90 BHP. directly coupled to 220-volt dynamos. The arrangement is such that under any condition one engine is standing by as a spare. There are 14 electric winches, 12 of 3 tons and 2 of 5 tons each.

During the full power trial a speed of 12.76 knots at 3784 IHP. was obtained with the engines making 152.9 revolutions. The consumption of fuel was .145 kgs. of ordinary Borneo Crude oil IHP. hour, this including such auxiliary machinery as was in operation. The trial proved satisfactory in every respect and on August 17 the "Australien" cleared on her maiden voyage.

During the past year, a total of 3555 steamers with a tonnage of 4,517,655 entered and cleared the port of Dairen; of these one was American.

The New York Shipbuilding Company has booked an order for two 12,000 tons deadweight colliers.

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The "Kroonland" of the Panama-Pacific line. It is believed that the service of this vessel and the "Finland" will soon be augmented by two other boats.

PROBABLE DEVELOPMENT OF THE PANAMA-PACIFIC LINE.

The "Kroonland" and "Finland," operating between New York and San Francisco, have met with such a large measure of success that it is altogether probable, despite the allurement held out by trans-Atlantic freights, that two other steamers will be placed on this run by the International Mercantile Marine Company. The two steamers which will most probably be used to augment this service will be the "Korea" and "Siberia," recently purchased with the other vessels of the Pacific Mail's transpacific fleet.

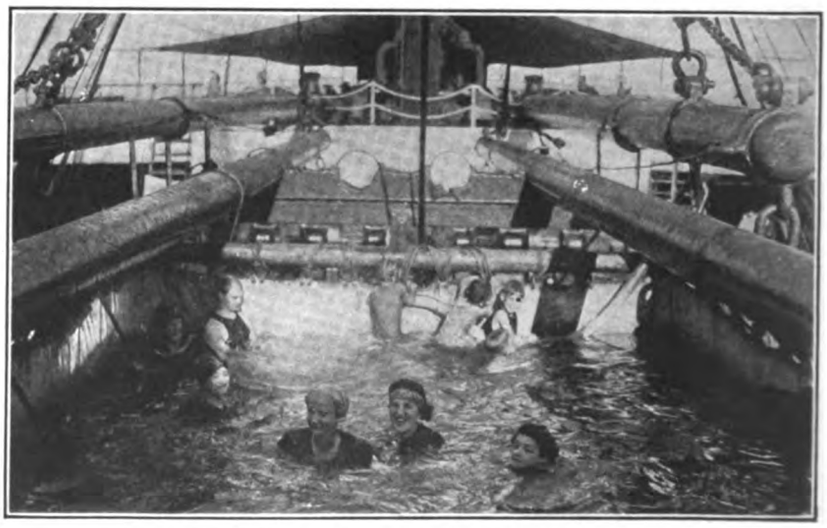
When the International Mercantile Marine Company got into financial difficulties and a reorganization was found necessary, the preferred and common stock as well as the two bond issues, were greatly reduced. In addition to this reduction the greatly increased earnings of the past twelve months, due to the abnormal freights caused by the war, has caused the International Mercantile Marine Company to experience a spectacular rise from its difficulties and it now looks as if the purchase of the Pacific Mail fleet, reasonable depreciation allowances, interest on bonds and a fair return on both preferred and common stock, will be financed from earnings for the present year without utilizing the $2.50 per share assessment which constituted a part of the reorganization scheme. It will be seen that by the time freight rates have subsided to their old level the company should be in excellent condition.

The addition of the "Korea" and "Siberia" to the run now occupied by the "Kroonland" and "Finland" will enable the Panama-Pacific Line to offer a most attractive freight and passenger schedule. The "Kroonland" and "Finland" are steel, twin screw, four decked steamers of 12,185 tons gross register, 560′ 0″ long, 60′ 2″ beam, and 38′ 4″ molded depth. These ships and their machinery were built by the William Cramp & Sons Ship and Engine Building Works. The "Korea" and "Siberia" are twin screw steamers of 11,276 tons gross, 551′ 7″ long, 63′ 2″ beam and 40′ 8″ depth. They were built by the Newport News Shipbuilding and Dry Dock Company.

The popularity of the canal route from a passenger point of view seems to be steadily developing rather than diminishing, and with the present high standard of service there can be little doubt that more steamers on the run will soon become imperative.

Due to the war the Canadian Pacific steamship lines had a falling off in gross business of $31,000,000 for the fiscal year just closed, and at the same time operating expenses were reduced $22,000,000, leaving a net loss of $9,000,000.

The recent launching of the torpedo boat destroyer "Porter" at the William Cramp & Sons Ship and Engine Building Company's plant, and the "Tucker" at Fore River, puts all six of the 1000-ton class of destroyers in the water.



Swimming Pool on Board the Panama-Pacific Liner "Finland."

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The tug "Chickamauga," the latest Diesel-engined craft in Puget Sound service.

Diesel-Engined Tug "Chickamauga"

A NEW contestant in the Puget Sound towing field that promises much as the forerunner of similar vessels, is the Diesel engined tug "Chickamauga," owned by the Pacific Towboat Company of Seattle.

We reproduce with this article a photograph of the "Chickamauga." This illustration will have added value to the observer inasmuch as it represents the first Diesel engined tug in America, quite an event in American maritime history, and on this account the false presentments are well worthy of saving as souvenirs.

The "Chickamauga" is 70′ long, 18′ beam and 10′ deep, and is appointed in a very thorough manner in all particulars, including a new type of towing machine, made from designs of Seattle Port Engineer Studdert. The tug is of exceptional strength throughout, with easy graceful lines, and regardless of the lack of funnels, impresses one with her indication of sturdy ability.

The "Chickamauga's" service is largely confined to the heavy continuous work of towing Puget Sound log rafts, and the tug has proven that results are to be obtained from the Diesel engine in towing service, because of the steady, regular output of power automatically furnished, and under a central control.

Manager McNealy, of the Tow Boat Company, expresses great satisfaction with the work of the "Chickamauga," being in a position to make the proper comparison, as he has under his direction many other types of vessels in similar duty.

The guaranteed fuel oil consumption of one-half pint per horsepower hour, contracted for by the builders of the Nlseco Diesel, the New London Ship & Engine Co., of Groton, Connecticut, has been more than fulfilled as the "Chickamauga" in regular service consumes but 12 gallons of oil for the 240 horsepower. This at the present market price (Seattle) of 2 1-7c per gallon, makes the hourly cost 26 5-7c; add to this, lubricating oil at 6c per hour, and the grand total of 32 5-7c is, to the owners, the gratifying result.

The Government steel sea-going hydraulic hopper dredge "San Pablo" was launched last month by the Baltimore Dry Docks and Shipbuilding Company for the U. S. War Department service on San Francisco Bay and District. The dredge is 155′ long, 35′ beam and 17′ molded depth. The hopper capacity is 490 cubic yards.

The Crowell & Thurlow Company of Boston has ordered two additional freighters from the Newport News Shipbuilding and Dry Dock Company. These vessels will be 395′ by 55′ and will cost $600,000 each.

Speaking of rapidly developing merchant marines, in 1903 Greece had 210 steamers with a combined tonnage of 202,140, and at the end of 1914 she had 440 steamers with a tonnage of 900,000.

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ELLIOTT BAY DRYDOCK COMPANY BUSY.

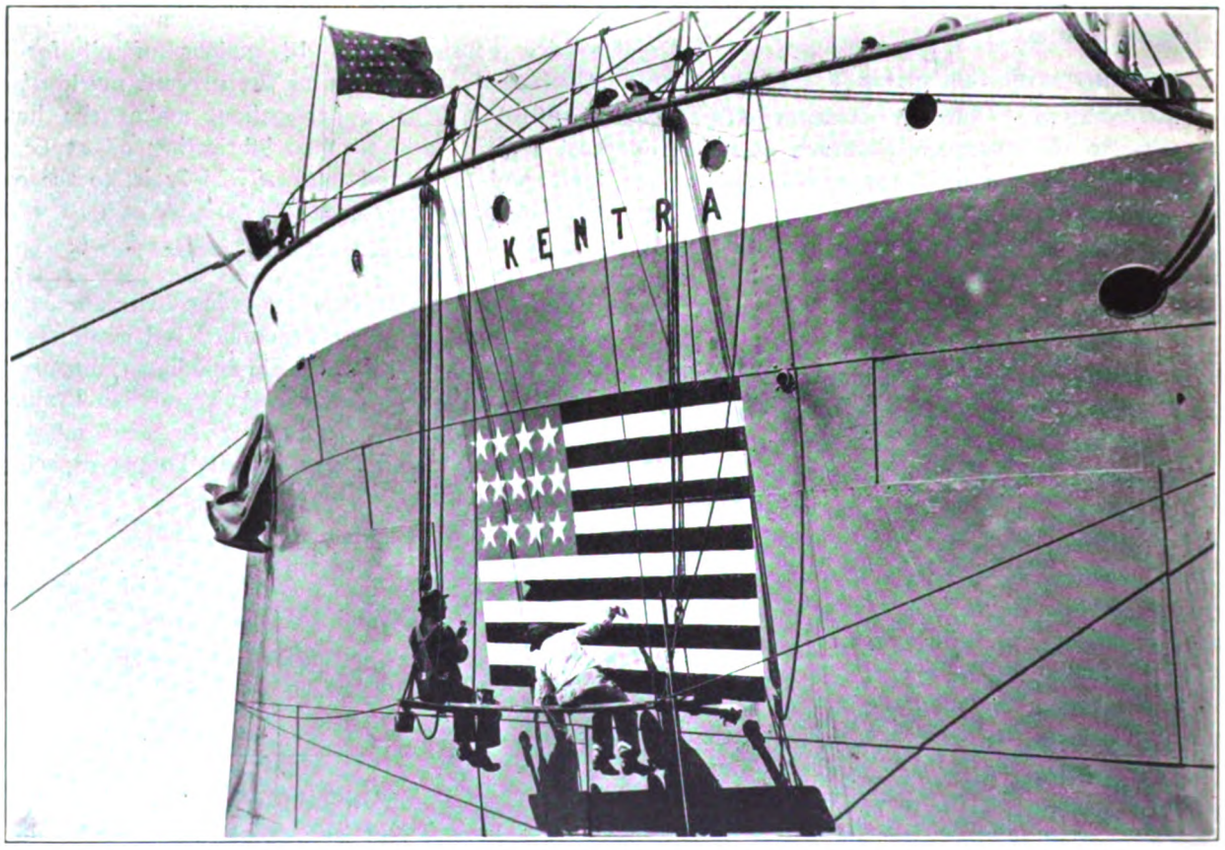
The Puget Sound Passenger and freight steamer "Washington" was recently docked at the Elliott Bay Dry Dock Company's plant for cleaning, painting, renewing shoe and rudder trunk and installing new lead sleeves. The propeller, tail and intermediate shafts were removed and taken to the Marine Pipe and Machine Company shop where the shafts were straightened and new bronze bushings fitted. All main, thrust and spring bearings were rebabbitted and considerable minor repairing carried out on the machinery. The whole of the work was done in the extremely creditable time of ten days. The Elliott Bay Dry Docks have been kept rather busy during the past two months with a large number of dockings for cleaning, painting and minor repair work.

A new booklet entitled "Boiler Valves," gotten out by the Wm. Powell Company of Cincinnati, has just come to hand. This booklet is very carefully edited, well illustrated and contains much valuable information concerning this section of the Wm. Powell Company's business. As Powell "White Star" Valves are recognized as being of an extremely high class of excellence, both as to design and workmanship, engineers would do well to secure these booklets and look into the various "Powell" features.

PULVERIZED COAL.

The Pacific Coast Steamship Company has prepared to test the possibilities of burning pulverized coal under boilers on board ship. It is believed that the solving of the problem of burning pulverized coal will result in a large enough saving to make coal a serious competitor of oil for marine power plants. The saving expected will be two fold: First, the cheapest grades of coal can be used and second, dust and ashes are eliminated and in railroad experiments a saving of from 15 to 20% in the amount of fuel has been demonstrated. As in burning oil, a strong artificial draft is necessary while grates, ash pans, smoke-box netting, spark hoppers, firing tools, squirt hoses, etc., are eliminated. The pulverized coal is fed into a blower by a gravity conveyor and the blower shoots it into the fire-box, where combustion takes place in a similar manner as with oil fuel.

The two new steamers for the Luckenbach Steamship Company building at the Fore River Shipbuilding Corporation, are 437′ 5″ between perpendiculars, 57′ 0″ molded beam and will be driven by turbines working through reduction gearing to develop 4000 horsepower on a single shaft. Great care is being taken to secure the maximum efficiency in the cargo handling gear of these vessels, and each is to be fitted with twenty-four booms.



Placing identity marks on the Maple Leafer "Kentra," preparatory to a trip through the submarine zone. Photo by Mr. Geo. W. Miller of San Francisco. Mr. Miller has a very large collection of interesting waterfront views, and anyone interested in marine photographs should not fail to visit his studio.

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Mr. Arthur Fuller, general sales agent of the New London Ship and Engine Company.

WILL DIRECT NLSECO SALES.

The many friends of Mr. Arthur Fuller, formerly Pacific Coast Sales Agent of the New London Ship and Engine Company of Groton, Conn., will be pleased to learn of his appointment as General Sales Agent of that concern. Mr. Fuller left Seattle late in July and went to Groton after a short visit to San Francisco looking over the field here.

During three years' work in Seattle Mr. Fuller accomplished the difficult task of introducing to the shipowners and engineers of the Pacific Coast an entirely new engine. His first installation was a 120 horse-power Nlseco Diesel in the cannery-tender "Warrior" of the Pacific American Fisheries. This was followed by a similar engine in the cannery-tender "Chomley" owned by the Alaska Pacific Fisheries. Other boats equipped with Diesel engines by Mr. Fuller are the "Suquamish" of the Kitsap Transportation Company with a six-cylinder, 180 horse-power unit, and the Pacific Towboat Company's tug "Chickamauga" with a four-cylinder, 240 horse-power engine. This pioneering work was accomplished despite grave prejudices, but the results have vindicated Mr. Fuller's faith in the engine he was selling and installing, and a good start has been secured for internal combustion, heavy fuel engines on this Coast.

From now on Mr. Fuller will be engaged in directing the general sales work of the New London Ship and Engine Company throughout the United States, and the PACIFIC MARINE REVIEW joins with his many friends in wishing him a full measure of success in his widened field of endeavor.

TO MANAGE NEW STEAMSHIP LINE.

To become the active head of a steamship line at the age of thirty, is the rather unique experience of Mr. Fred D. Parr, who has just been made President of the Parr-McCormick Steamship line. Mr. Parr was born in Visalia in 1885 and educated in the public schools of that town. At the age of



Mr. Fred Parr.

fifteen he lost his father and was forced to assume the management of large property interests. This early business training stood the young man in good stead and when he entered the employ of the E. J. Dodge Company twelve years ago his ability was recognized and he gradually rose until seven years ago he became manager of the Steamship Department of this firm.

On September 1st of the present year, Mr. Parr became the head of the newly-formed corporation known as the Parr-McCormick Steamship line, being associated with a Board of Directors made up of the following well-known steamship and insurance men: S. M. Hauptman, Vice-President of the new corporation; E. A. Christenson, E. S. Livingston, W. R. Chamberlin, Ira A. Campbell and Charles R. McCormick.

While Mr. Parr's rise in steamship circles has been very rapid, it has met with the approval of the shipping fraternity as being a fitting reward for integrity and merit.

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With Those Who Do Things

AMONG refrigerating and ice-making machines, none holds a higher reputation than that manufactured by the Vulcan Iron Works of San Francisco. This reputation has been built up on long service, careful construction and high reliability covering a long period of years, and the Vulcan machinery is one of the few California products that has held and maintained a country-wide reputation.

The Vulcan machinery operates on the compression system, the cooling effect being produced by the evaporation of liquid anhydrous ammonia. Liquid ammonia is obtained from the manufacturers in iron drums—the ammonia in the drums being under a pressure of about 150 pounds. Liquid ammonia under atmospheric pressure boils at about 30 degrees below zero Fah. and expands into a gas occupying about 1000 times its volume as a liquid. If a drum of liquid ammonia be connected to the cooling system, and the ammonia be allowed to expand into coils of pipes, an intense cold will be produced in the pipes. If the pipes be placed in a room, heat will be absorbed, or, if the coils be placed in a tank of brine, heat will be absorbed from the brine and the brine will be cooled for refrigerating or ice-making purposes.

The expanded ammonia might be allowed to escape to atmosphere and its place constantly supplied with new ammonia; but such a method would be very expensive. The desirability is therefore evident of so handling the ammonia gas as to reduce it to its original liquid form and use it over and over again. Reducing ammonia gas to liquid form and returning it for further work is the function of the refrigerating machinery. Compressing the gas is done by the ammonia compressor, by which the expanded gas is drawn through expansion coils, compressed to the liquefying pressure of 140 to 175 pounds and then forced into the ammonia condenser. The ammonia condenser is an arrangement of pipes surrounded by cold water, or with cold water flowing over the pipes. The cold water deprives the gas of the heat it has absorbed during its passage through the expansion coils; and owing to the combined influence of pressure and cold, the gas is condensed, becomes a liquid and passes on to the liquid ammonia receiver, from which it is again allowed to expand into the expansion coils.

The liquid ammonia is expanded into the coils usually from 15 to 30 pounds gauge pressure, producing a range of temperature inside the coils between zero and 20 degrees Fah. Lower temperatures can be obtained by working at lower pressures; but a loss in efficiency results from working at a lower pressure and temperature than is absolutely required. This is caused by the fact that the reduced quantity of ammonia circulated is not compensated for by the drop in temperature obtained.

Marine refrigerating plants require special consideration and treatment, the conditions of operation being most severe, with limited space for machinery, etc., and the plant as a whole and in every detail should be of such design, construction and workmanship as will best guarantee against stoppage through accident; for if the refrigerating machine should stop for any undue length of time, the perishable cargo and ship's food supplies would spoil. Either the brine system, the direct expansion system, or the indirect system is used as may best suit the conditions. On passenger steamers the brine system is advocated to avoid any possible danger from leakage of ammonia and also as it is more easily regulated. In small installations of compact arrangement a direct expansion plant is entirely suitable, costs less and takes up less room. Where large cargo spaces are to be cooled the indirect system is advocated, utilizing the circulation of cold air by fans, the air being cooled in separate coil chambers.

At the Panama-Pacific International Exposition will be found a splendid exhibit of the Vulcan refrigerating system, consisting of a complete plant in operation. Butter, cheese, meats and other edibles are carried in a glass-fronted refrigerating chamber, and the entire absence of moisture is specially notable.

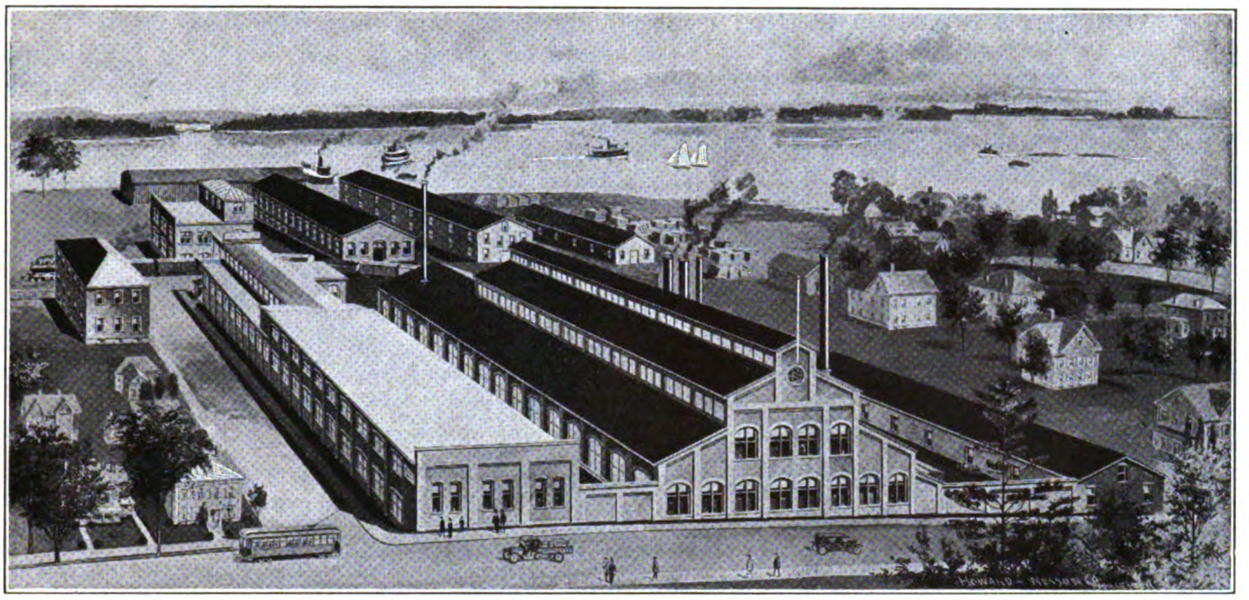
The Florida East Coast Railway has contracted with the Cramp Yard at Philadelphia for a duplicate of the car ferry "Henry M. Flagler," designed by M. C. Furstenau. Another contract recently received at Cramps is a 10,000 ton oil tank steamer for the Sun Oil Company.

Launchings at Fore River are becoming rather common occurrences, as during the past month or two there has been a launch nearly every week, the large number of submarines taking the water making this possible.

On September 9th, the New York Shipbuilding Company launched the collier "Plymouth," a sister ship to the "Franklin," for the Coastwise Transportation Company.

The Ellicott Machine Corporation has finished and delivered the powerful dredge "Comstock," for service at the mouth of the Brazos River, Texas.

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The plant of the Hyde Windlass Company, Bath, Maine.

HYDE WINDLASS COMPANY.

The Hyde Windlass Company was established about 45 years ago by the late General Thomas W. Hyde, of Civil War fame. This company is engaged in manufacturing windlasses, steering engines, winches, capstans and other auxiliary machinery, hand, steam and electric, for vessels of all types. Some idea of the extent of the business that has been built up is gleaned from the fact that the Hyde Windlass Company at the present time is turning out windlasses, steerers and other auxiliary machinery for yachts, barges, schooners, tug boats, steam trawlers, oil tankers, cargo steamers, lighthouse tenders, submarines, torpedo boat destroyers and the U. S. Battleships "Mississippi," "Arizona" and "Idaho."

A special line in which the Hyde Windlass Company has met with great success is the manufacture of "Hyde" manganese bronze castings to U. S. Government test requirements, specializing in propellers of this metal of all types and sizes ranging from the eight inch two blade wheel for light motor boats, to built-up or solid four-blade wheels 19′ 0″ in diameter and weighing 24,500 pounds.

The long and successful career of the Hyde Windlass Company has been made possible by the policy of standing behind every machine which it has manufactured as to workmanship, material and design and to-day it numbers among its customers practically every shipyard in the United States and Canada.

The PACIFIC MARINE REVIEW is in receipt of an urgent request for the March, 1914, and April, 1914, numbers of this publication, from the Librarian of Congress, Washington, D. C. Anyone who has one of these numbers to spare will confer a favor by sending it either to the PACIFIC MARINE REVIEW office or to Herbert Putnam, Librarian, Library of Congress, Washington, D. C.



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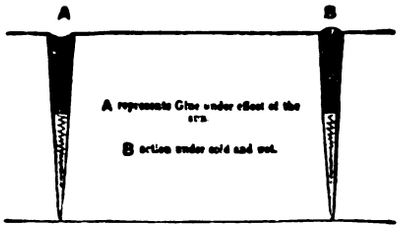
THE LARGEST STOCK OF HARDWOODS IN THE WEST

WYBROLITE WATERPROOF VENEER PANELS

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JEFFERY'S MARINE GLUE.

The reduced section of deck, shown herewith, illustrates the appearance of Jeffery's Marine Glue in the seams when the planks are under contraction or expansion. The flexibility of this glue is one of its most valuable qualities, as it allows the timbers to contract and expand, still retaining its great adhesive power to the edges of the plank. When the planks become contracted by the heat a draught takes place on the glue, and the seam becomes expanded as shown at A. When the planks are swollen by rains



and there is a pressure on the glue, the seam becomes contracted, as shown at B. As the temperature varies, these forms, A and B, continue to assume each other's shapes year after year (if the deck has been properly caulked and payed) until the deck becomes worn down to the oakum. Another advantage with Jeffery's glue is that it does not stick to the feet in hot weather.

Those who are interested in the proper treatment of deck seams should send for the new booklet entitled "Marine Glue—What to Use and How to Use It." This booklet contains sound information in short, concise form, and a note to L. W. Ferdinand & Company of 152 Kneeland street, Boston, will procure a copy.

THE WM. POWELL CO., CINCINNATI, O.

These well-known manufacturers of steam fittings and accessories of all kinds have for many years past made a point of issuing at frequent intervals a series of booklets which not only illustrate their goods and list prices but give details and particulars as well, not generally found in catalogs, thus obviating the necessity of writing the manufacturers for information. The latest published in the series is entitled The Powell Appliances for Automobiles, Trucks, Motor Boats, Gas, Gasoline and Oil Engines, and is, if possible, an improvement on its predecessors. It is prepared with the usual painstaking attention to valuable details, and is not only remarkably complete and well arranged but is of a convenient size for handling and is very clearly and distinctly printed on fine stock. Among the lines enumerated are The Powell Generator Valves, Gasoline Strainers, Priming Cups, Gasoline Cocks, Relief Cocks, Air Cocks, Hand, Air and Oil Pumps, Multiple Oilers, Lubricators, Oil Cups, Grease Cups, Whistles, Whistle Valves, Brass Fittings, Unions, Needle Point Valves, etc.

A feature for which The Wm. Powell Co. has long been noted is their celebrated "White Star" Valves. They are prepared at all times to furnish non-corrosive valves, cocks, and fittings at special prices. The Wm. Powell Co. solicit inquiries and have a competent engineering department constantly designing and working on special requirements. In addition to the appliances described in the booklet they manufacture a general line of valves and fittings for any Industrial Plant. All articles bearing the Powell trade mark are sold and guaranteed as to their mechanical perfection and superior workmanship.

NEW SEABURY MOTOR.

All working parts of this advanced type of "Speedway" engine are enclosed so that not a drop of oil can work its way from the engine into the bilges, and those who have suffered the evils of dirty oily bilges will well appreciate this advance in design and mechanical perfection.

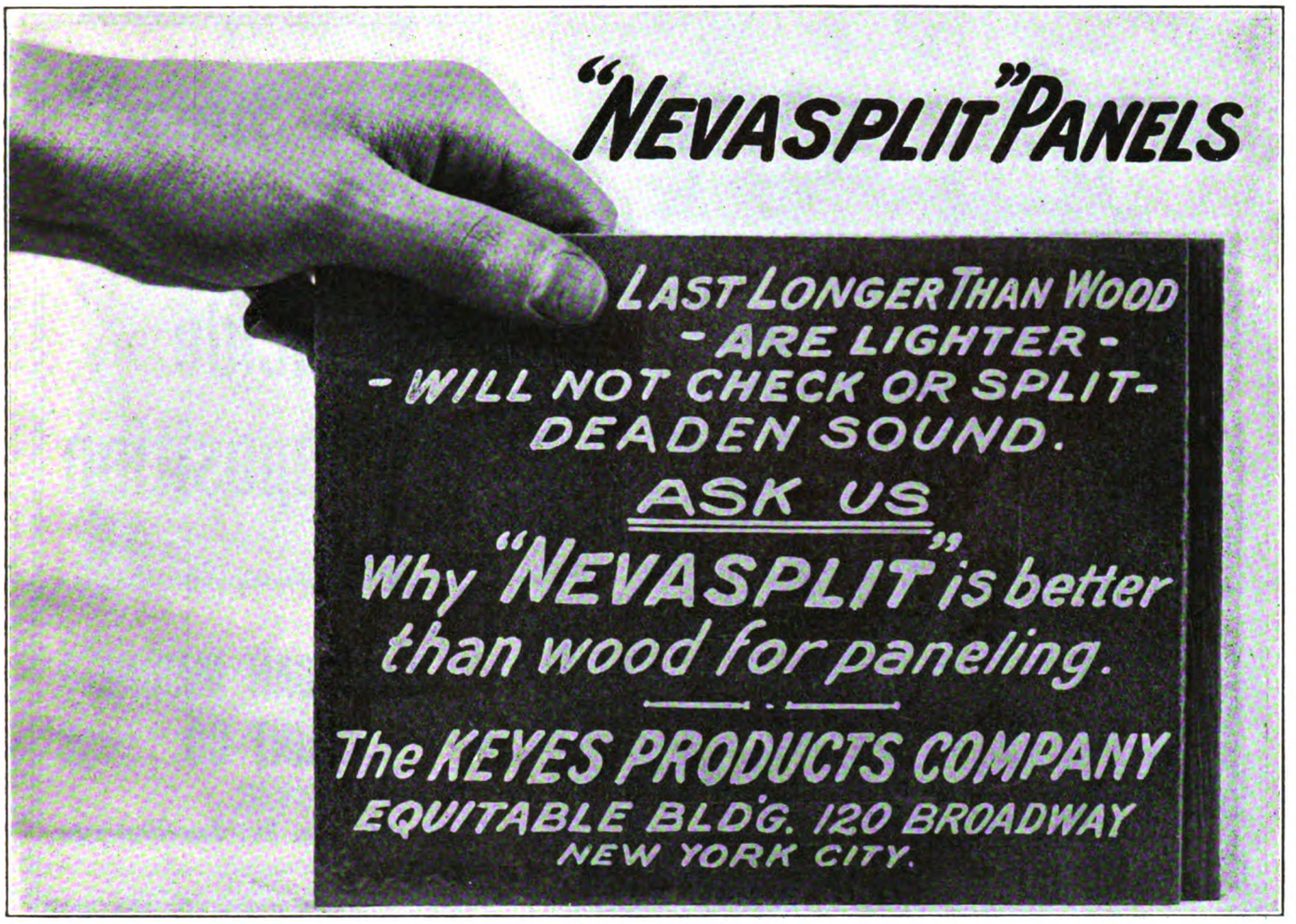
Although of 120 B.H.P., this heavy duty motor weighs but 5000 pounds, including its air starting system, which is a built-in part of the machine. The cylinders are of the twin type 6¾ inches bore by 8½ inches stroke and the revolutions number 500 to 600 per minute for a rating of 100 to 115 H.P.

The magneto is of the Bosch waterproof two-spark type; a springless carburetor is fitted as is also a double-acting bilge pump, double-acting piston with circulating pump, gear oil pump inside of engine housing and large noiseless air pump to supply compressed air for starting the engine and for the whistle, etc.

The working parts of this engine are automatically oiled by means of a force oiling system, the oil being forced through the crank shaft and from there to all the other working parts including the gears in the reverse clutch. The oil can be regulated to any desired pressure which pressure is indicated on a gauge mounted on the engine. The amount of oil contained in the engine oil-well will lubricate the engine for thirty days without renewal. Numerous and extra large handhole plates are provided for easily cleaning, etc.

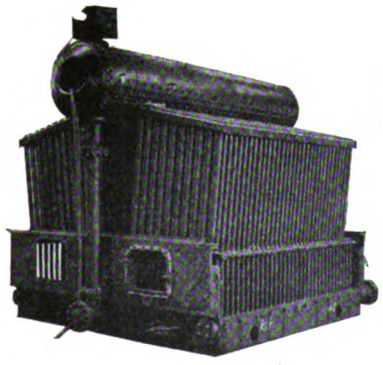
At a recent test before a number of engineers of prominence, the engine ran so smoothly that, though at full power, it was difficult to tell whether or not it was running. Indeed, five-cent pieces were balanced on their edges on top of the cylinders thus showing the entire absence of vibration. This engine attracted considerable interest among engine experts at the recent Motor Boat Show and they particularly noted the ease with which valves could be removed without disturbing the cylinders such as is the case with some other engines of the larger twin-cylinder types.

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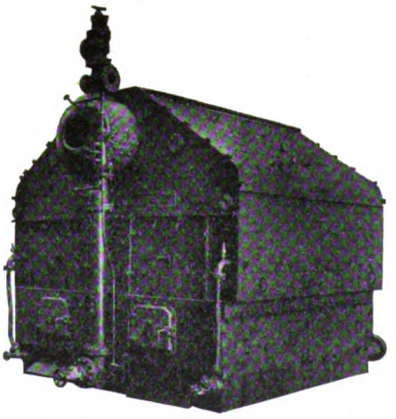


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INSTALLED and TRIED OUT
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ON THIS COAST
TUBES AND HEADERS
ALL SEAMLESS
DRAWN STEEL



Steam generated in VERTICAL TUBES can escape to the steamdrum by its natural buoyancy, while in horizontal tubes it can only be liberated after being forced with the water into the steamdrum. Think about this important feature and understand why BALLIN BOILERS furnish dry steam.
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BALLIN BOILERS have a large *Combustion Chamber;* all Engineers know its importance.
Sediment will not lodge in *Vertical Tubes,* for this reason the Engineers like them.

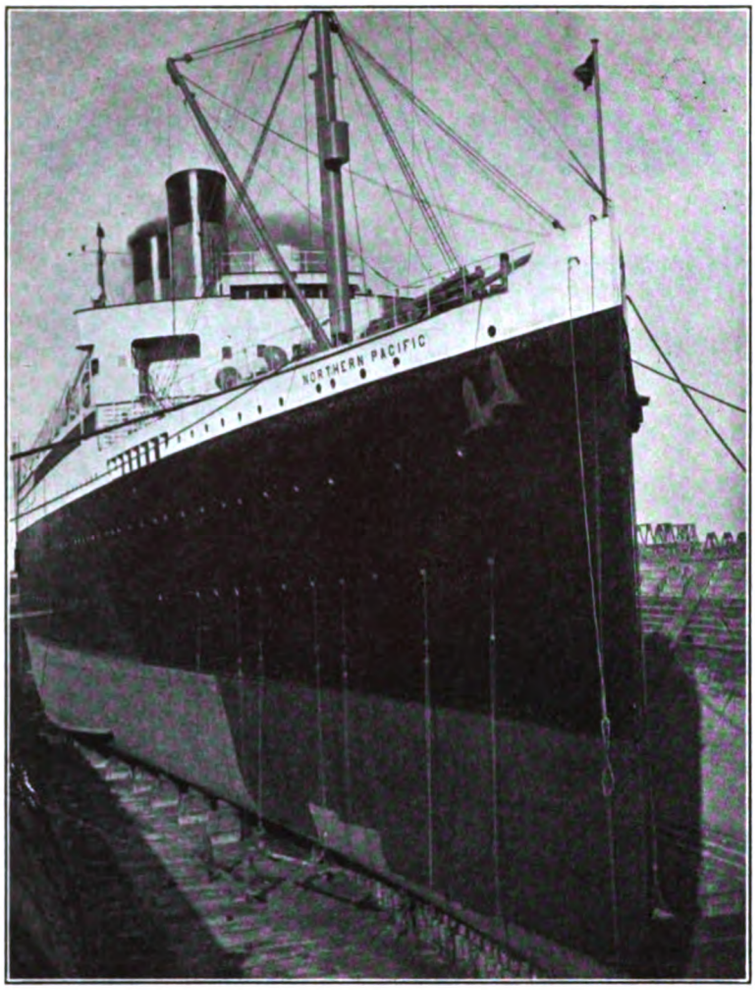
FOR FURTHER INFORMATION ADDRESS

Ballin Water Tube Boiler Co. **Portland, Ore.**

or FRED A. GARDNER, San Francisco Agent 528 Merchants Exchange Bldg., San Francisco

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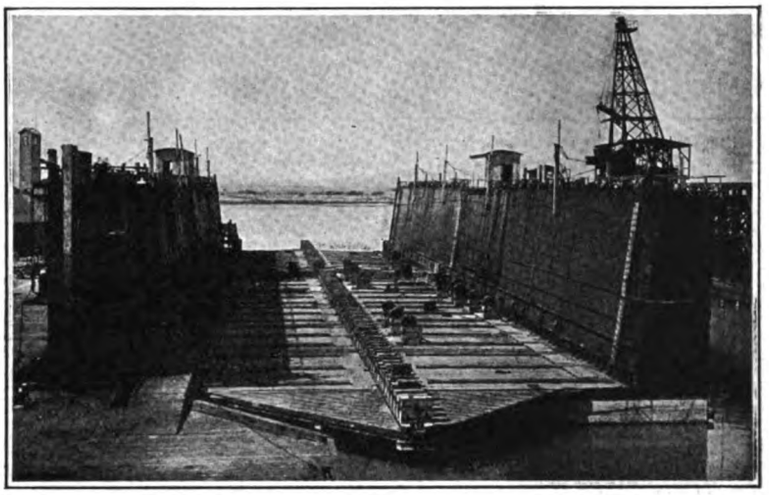
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over keel blocks.....352' 0"
over wings .....301' 9"

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between wings, bottom. 76' 0"

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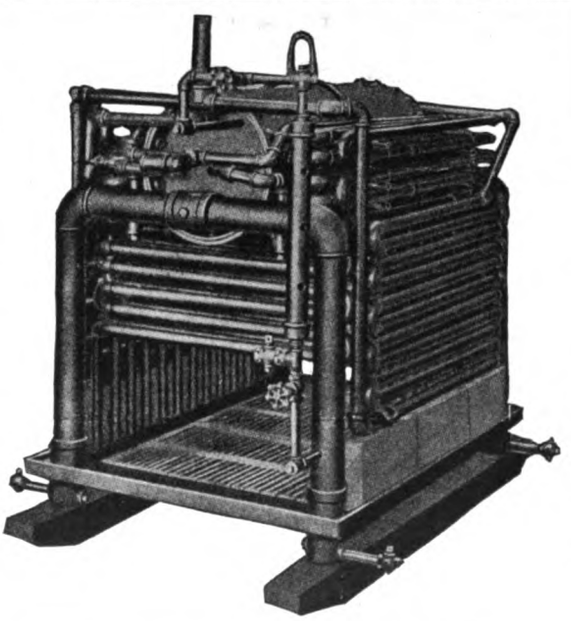
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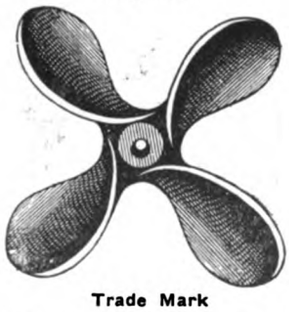
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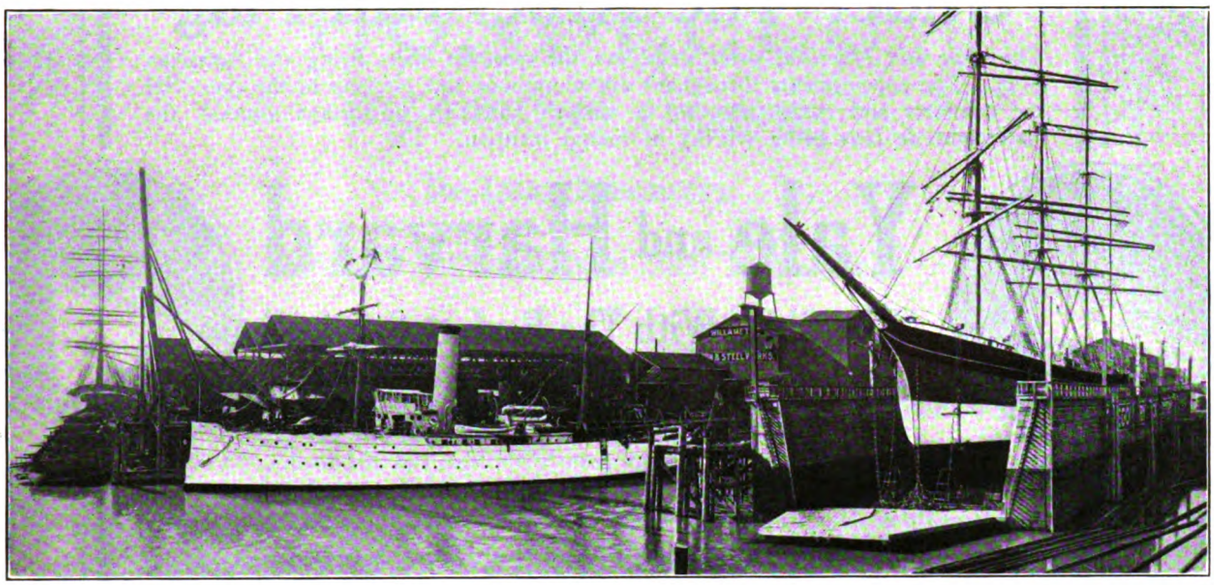
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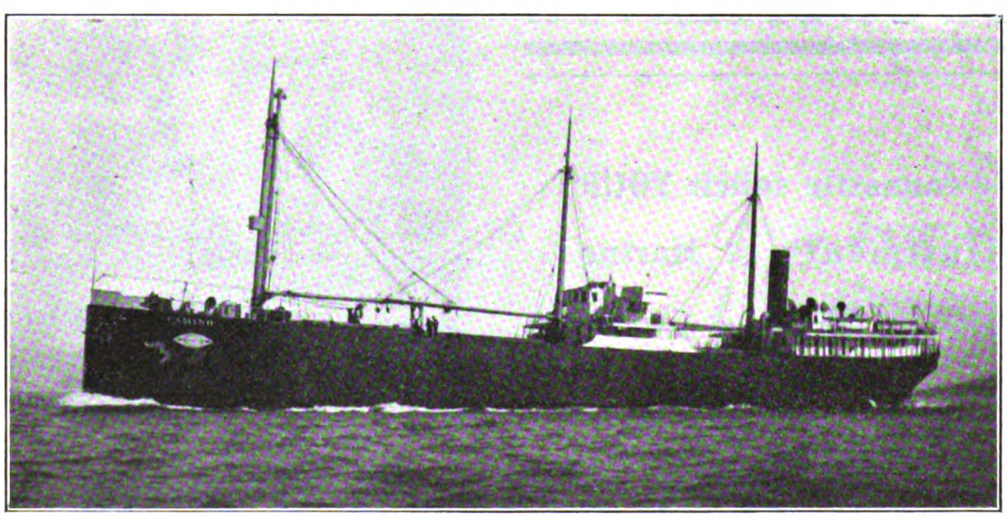
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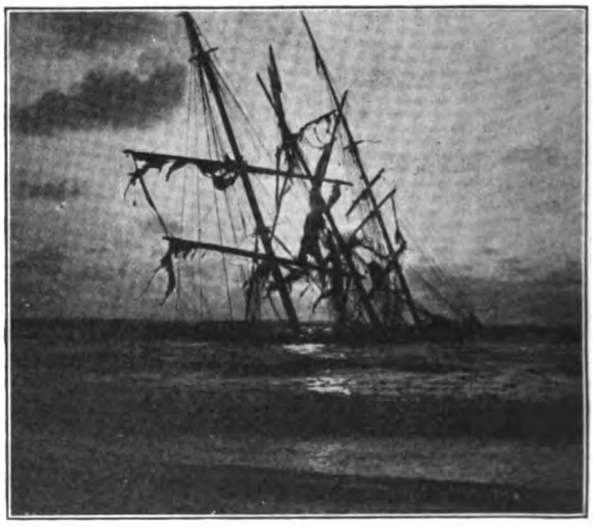
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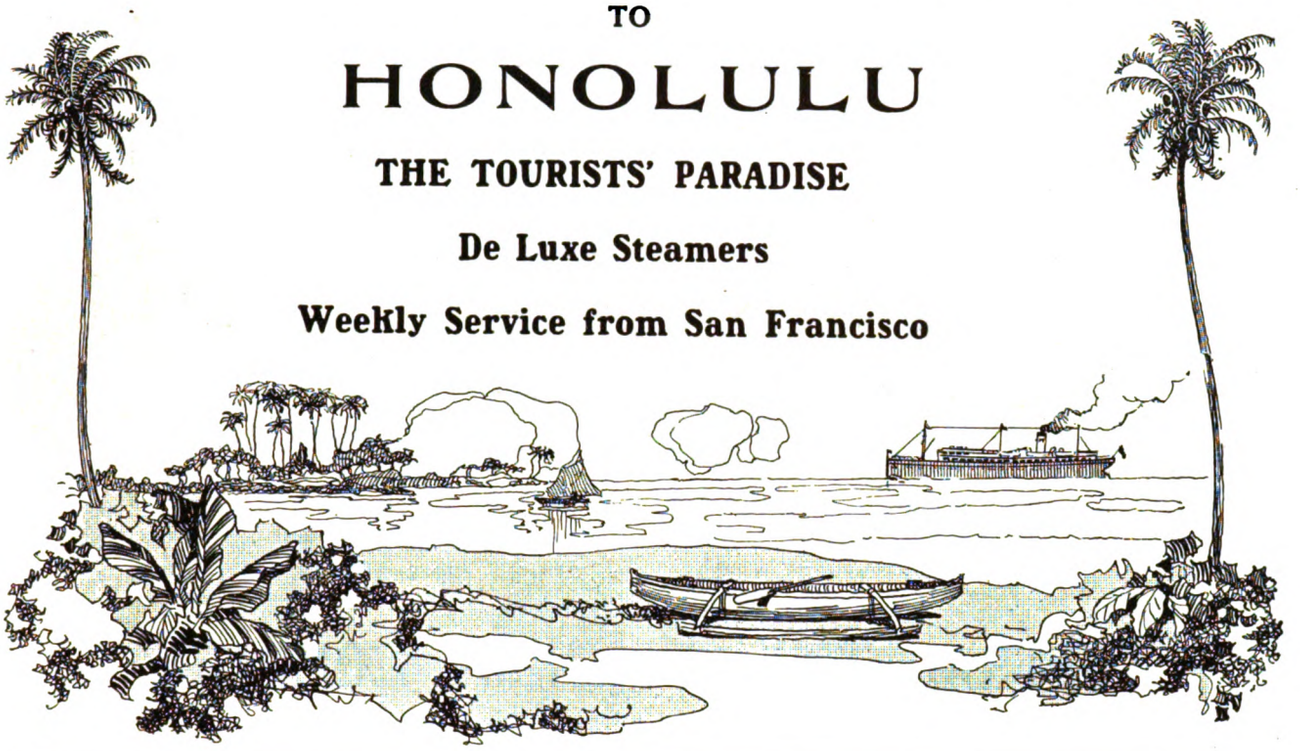
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211

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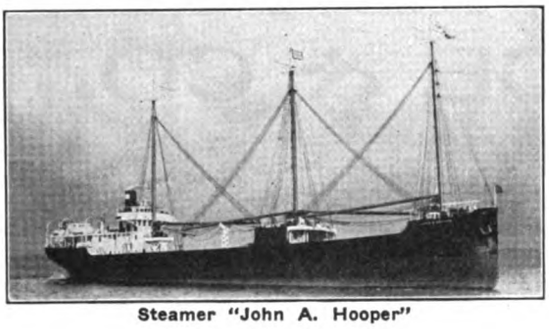
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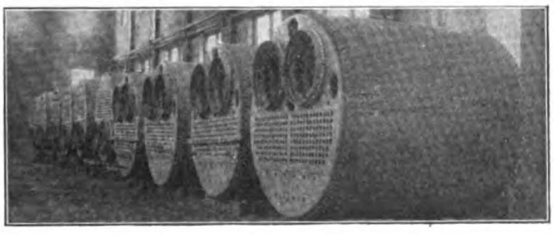
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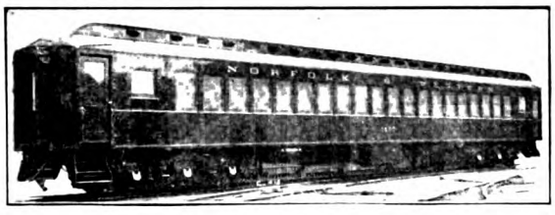
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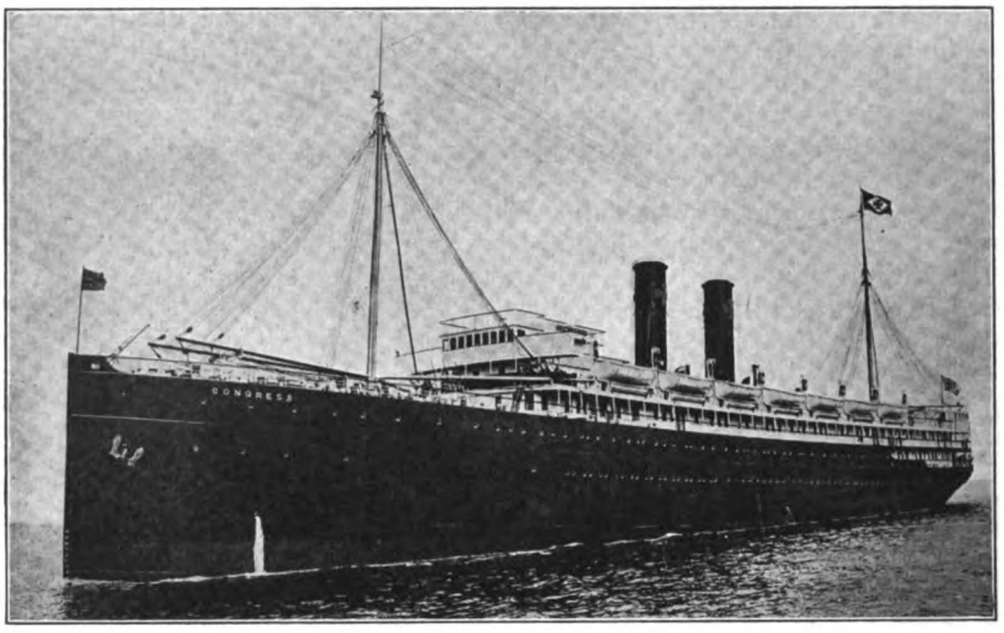
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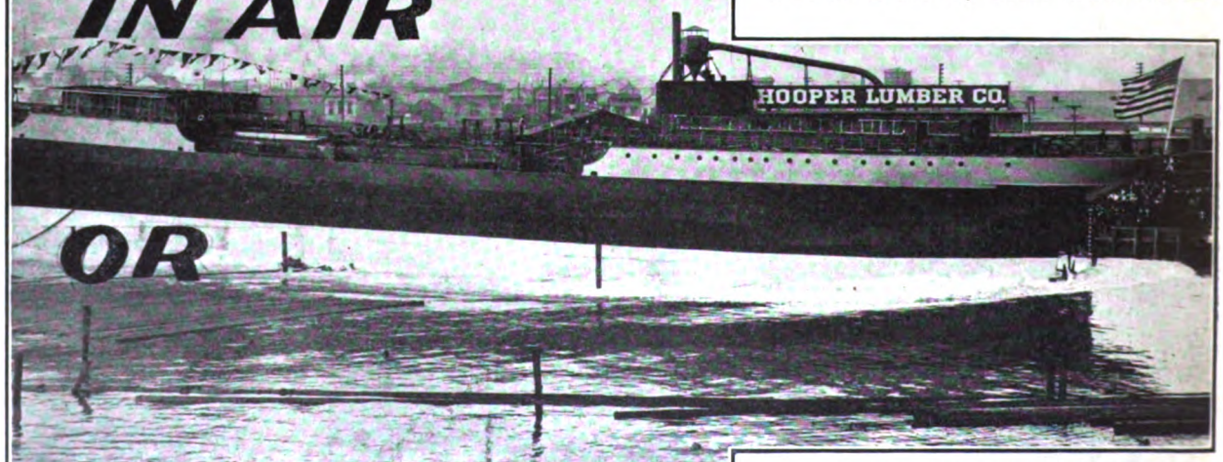
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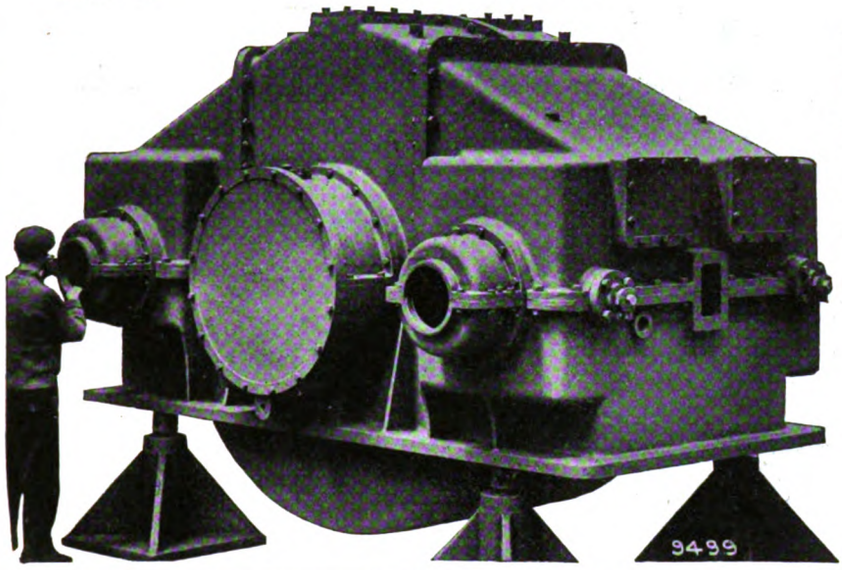
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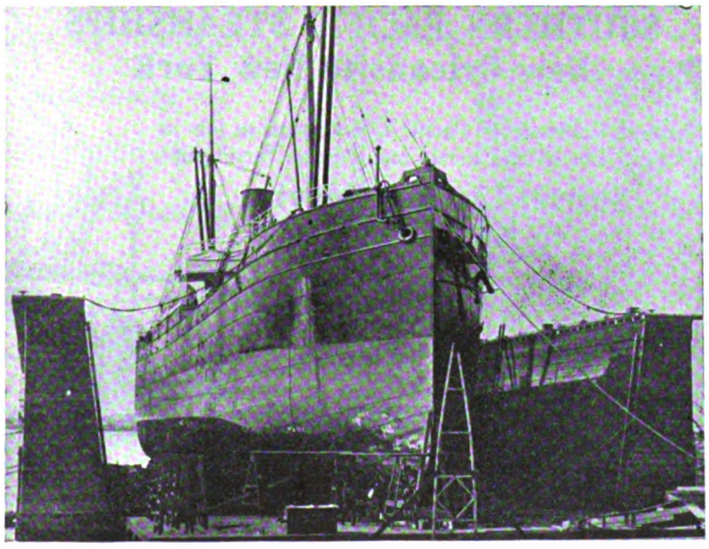
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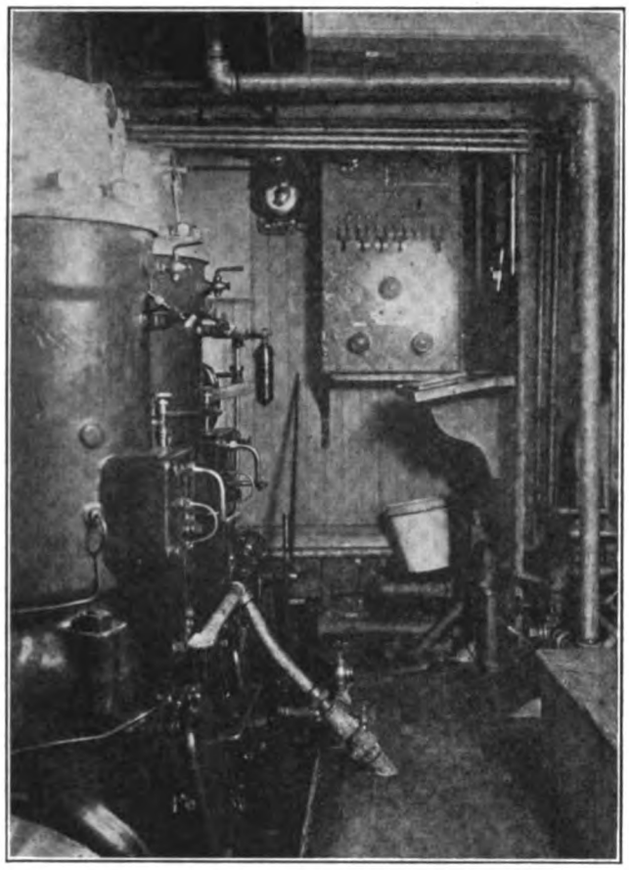
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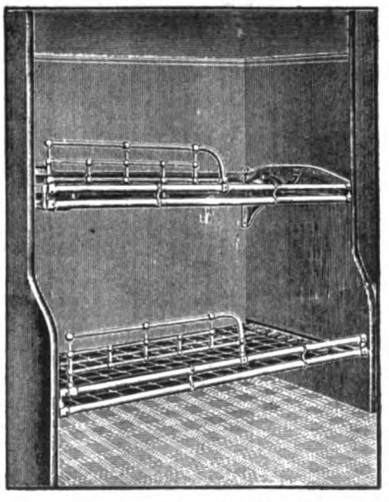
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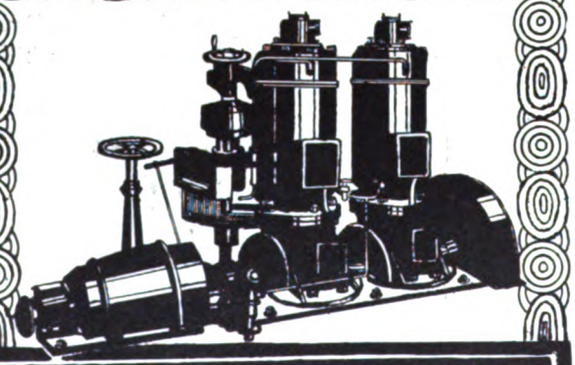
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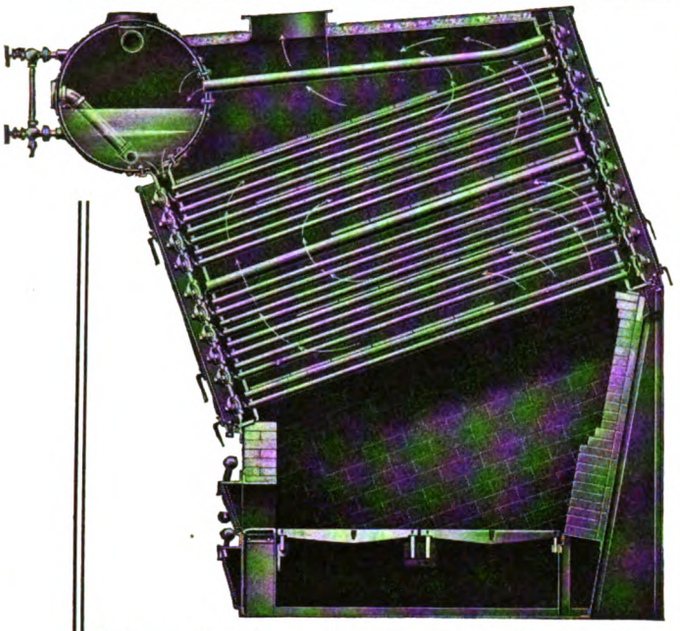
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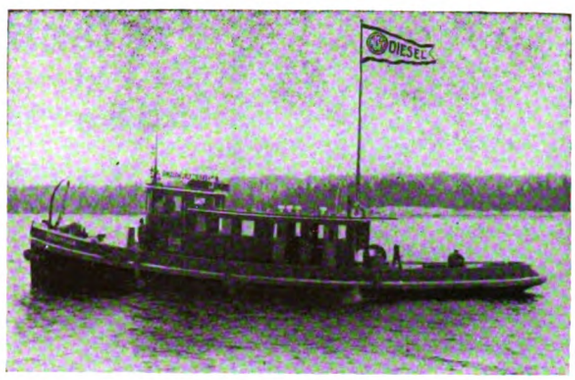
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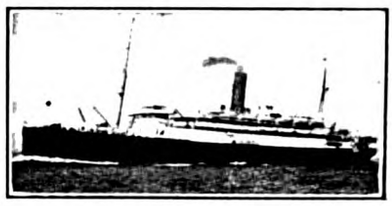
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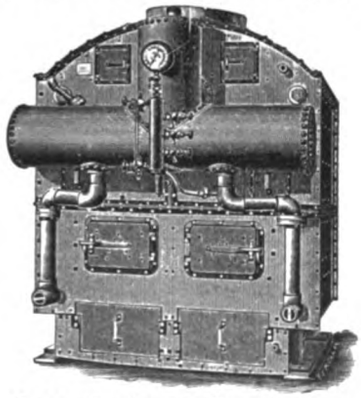
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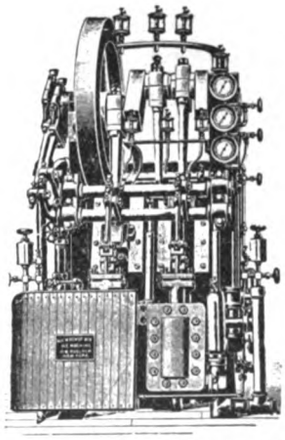
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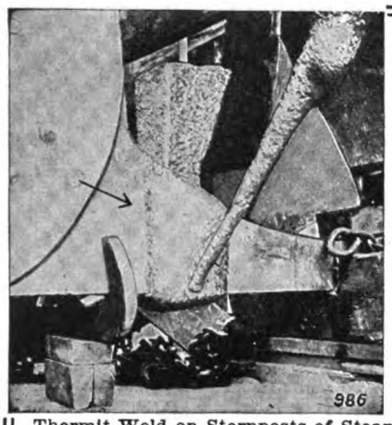
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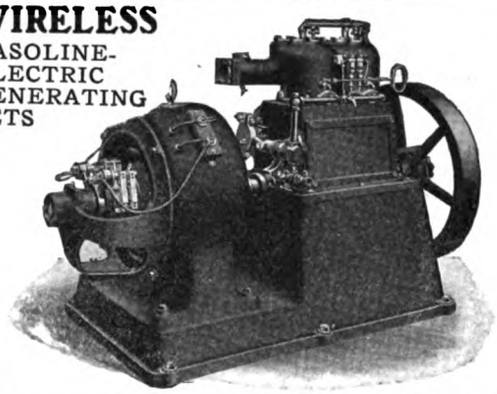
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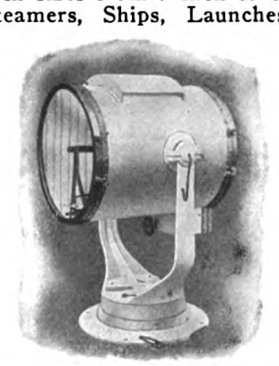
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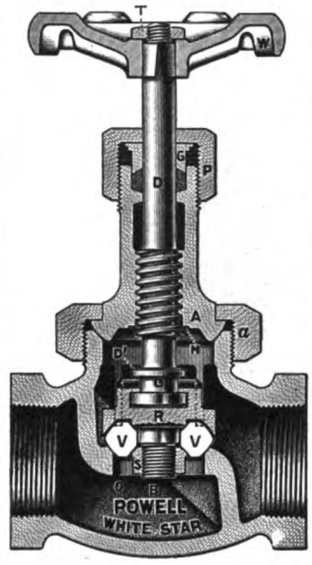
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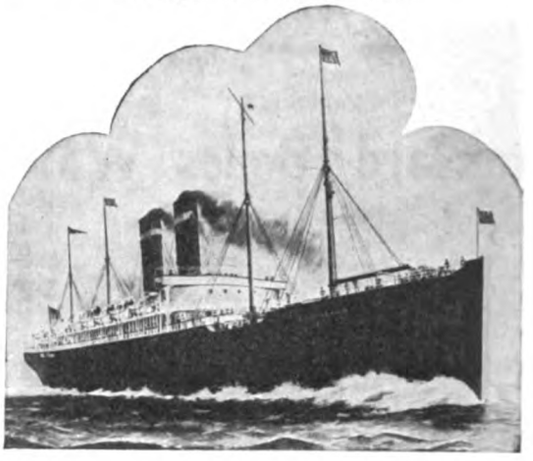


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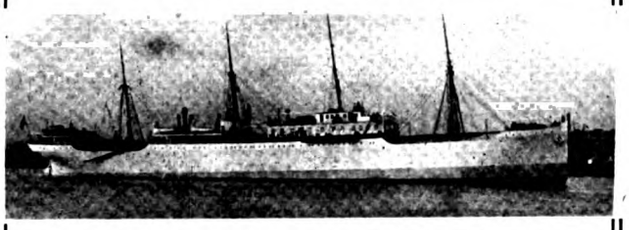
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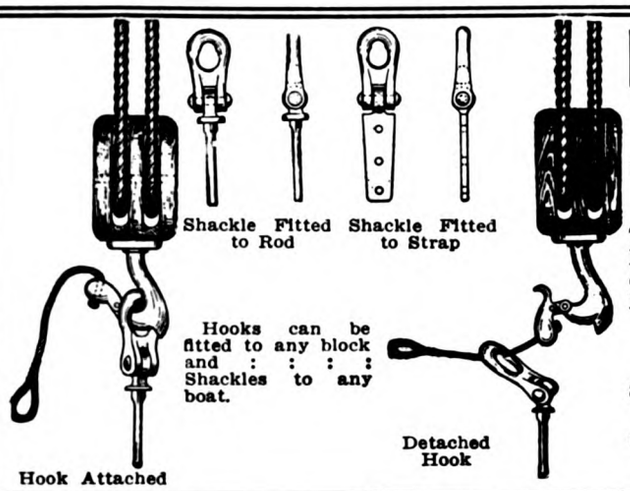
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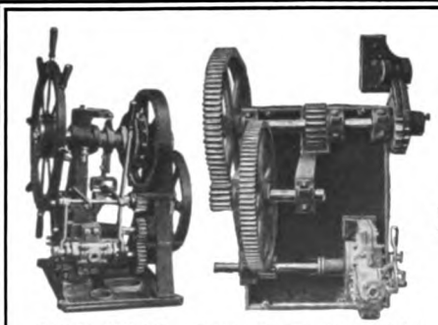
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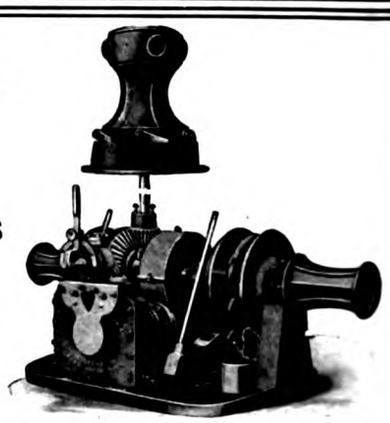
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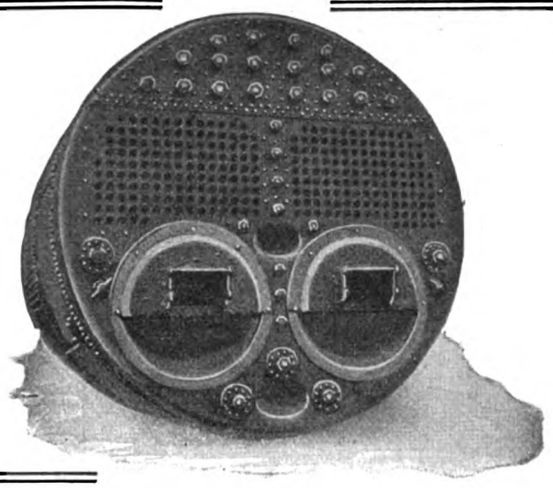
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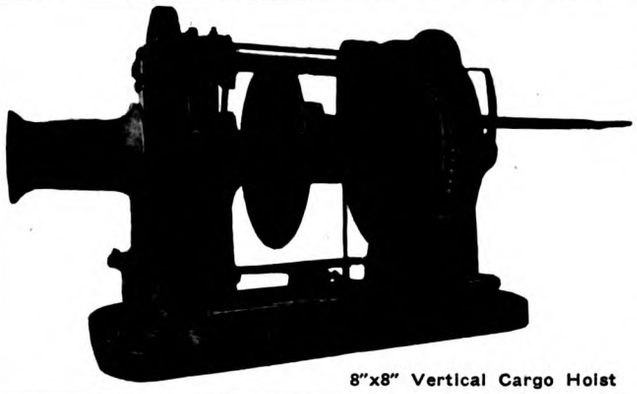


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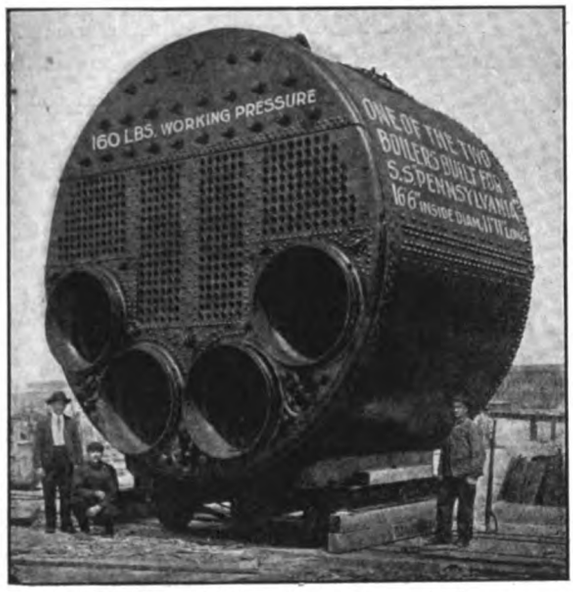
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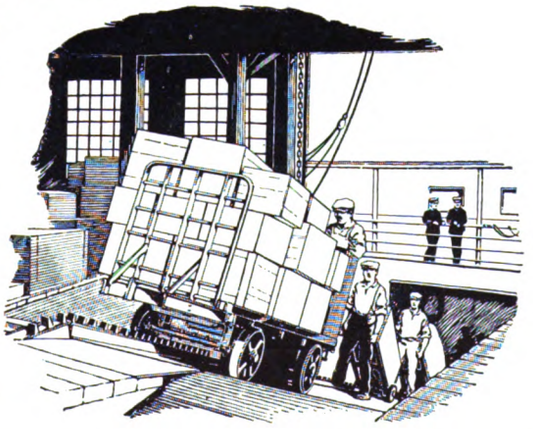
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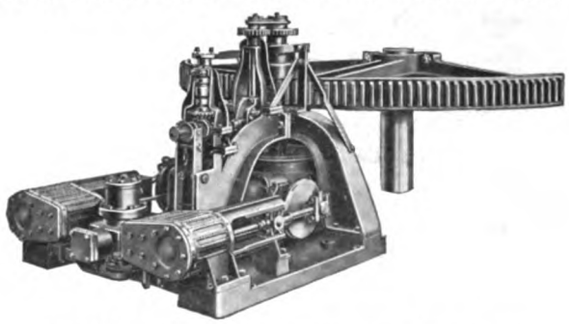
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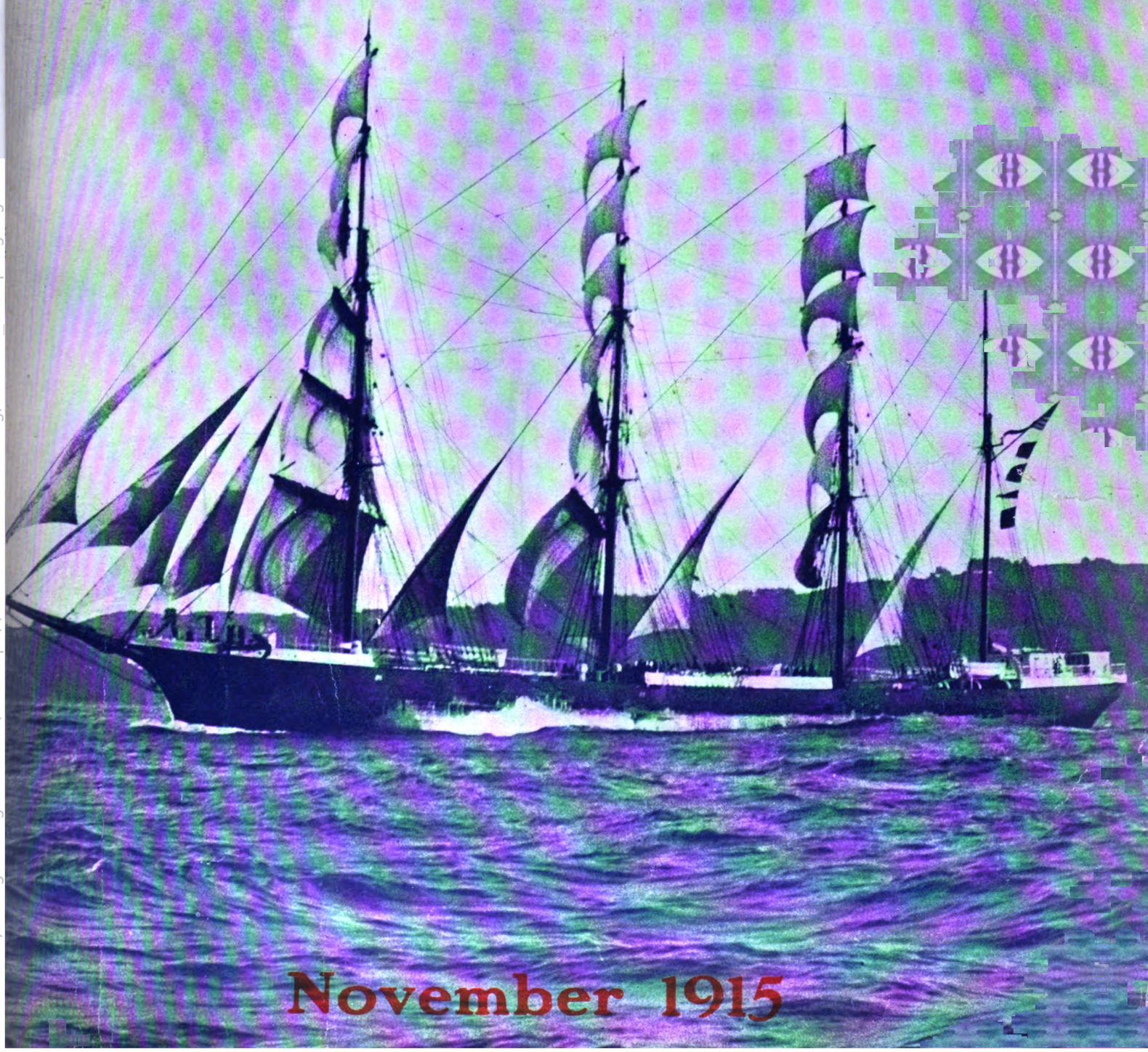
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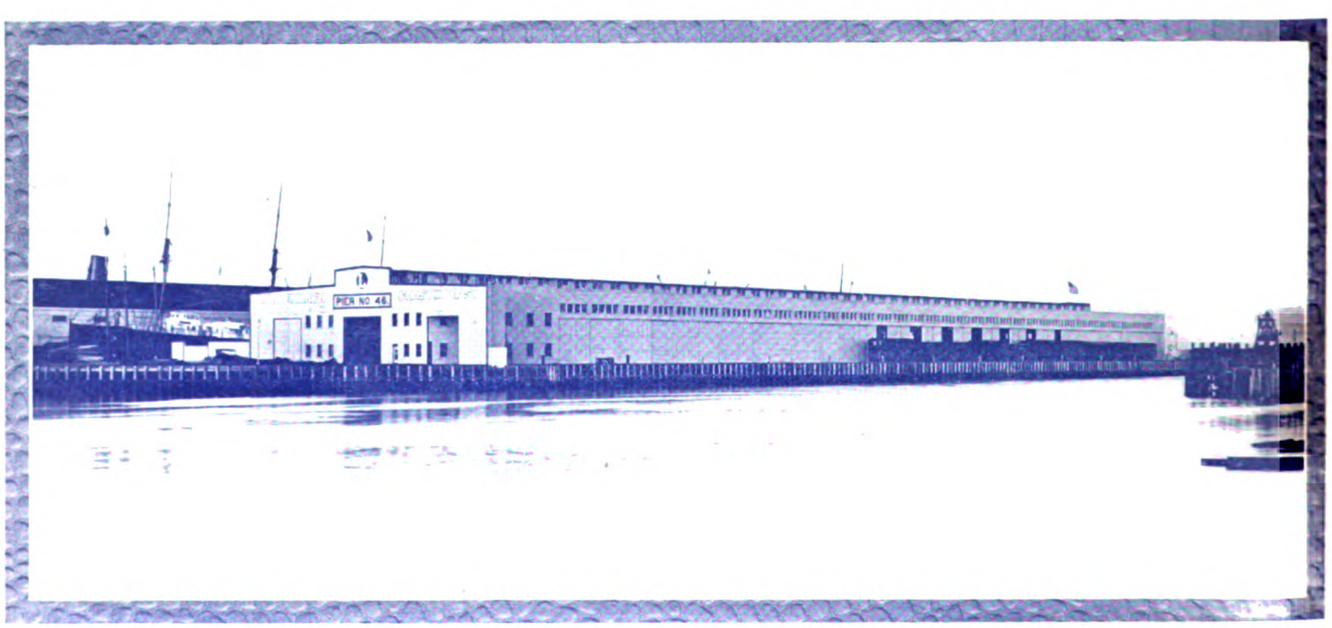
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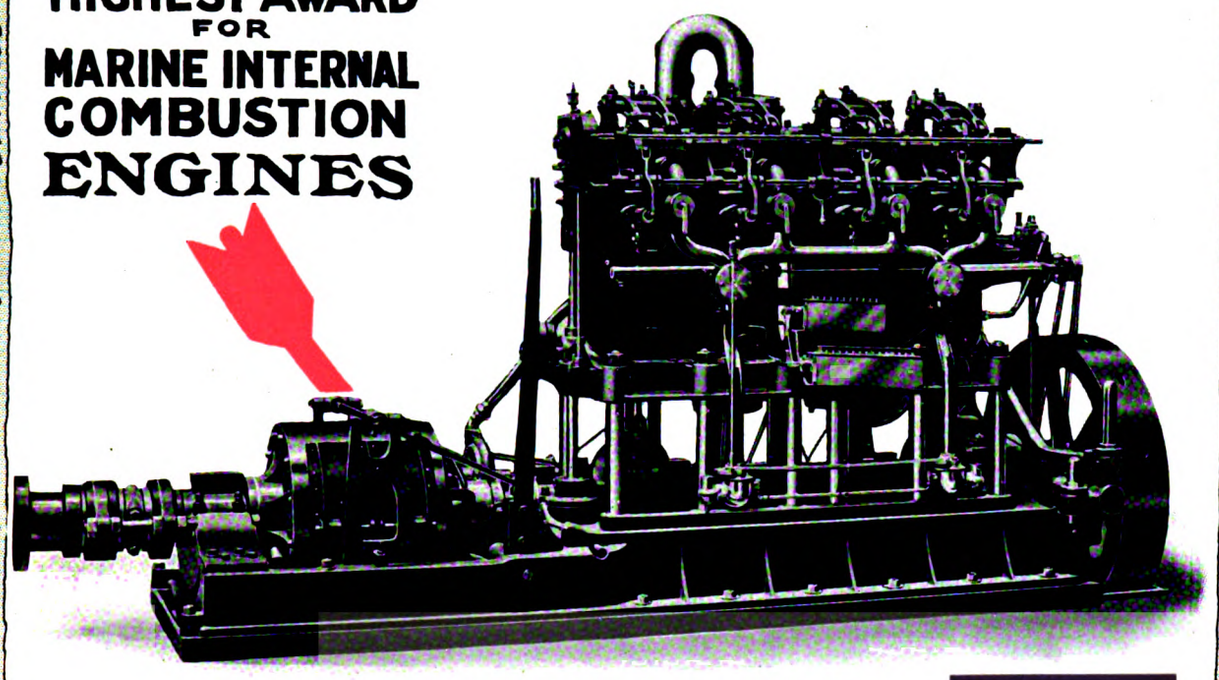
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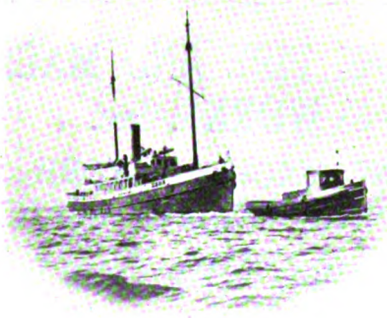
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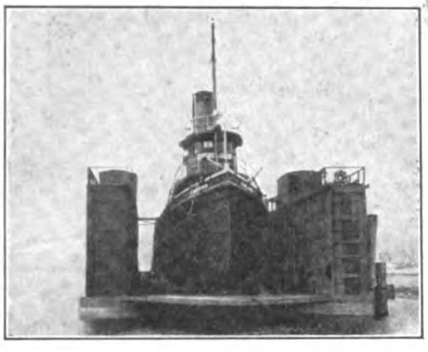
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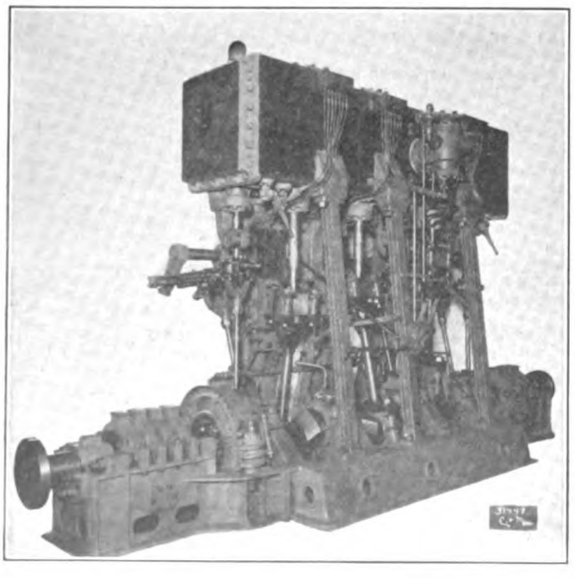


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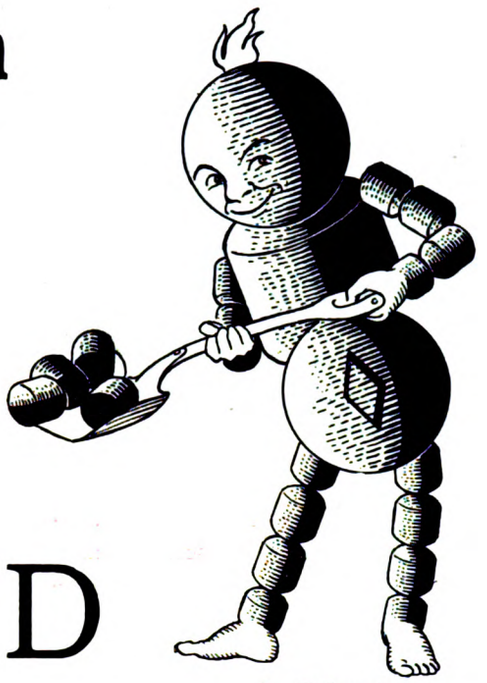
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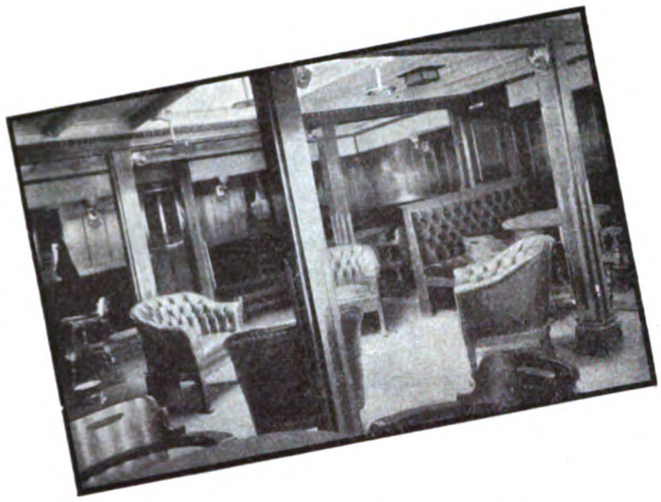
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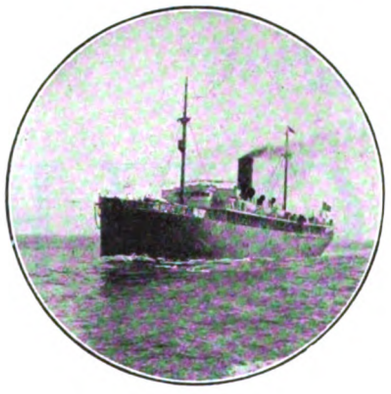


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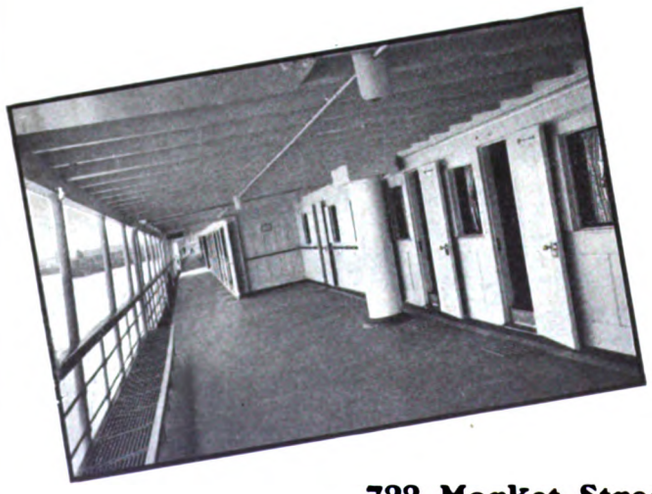
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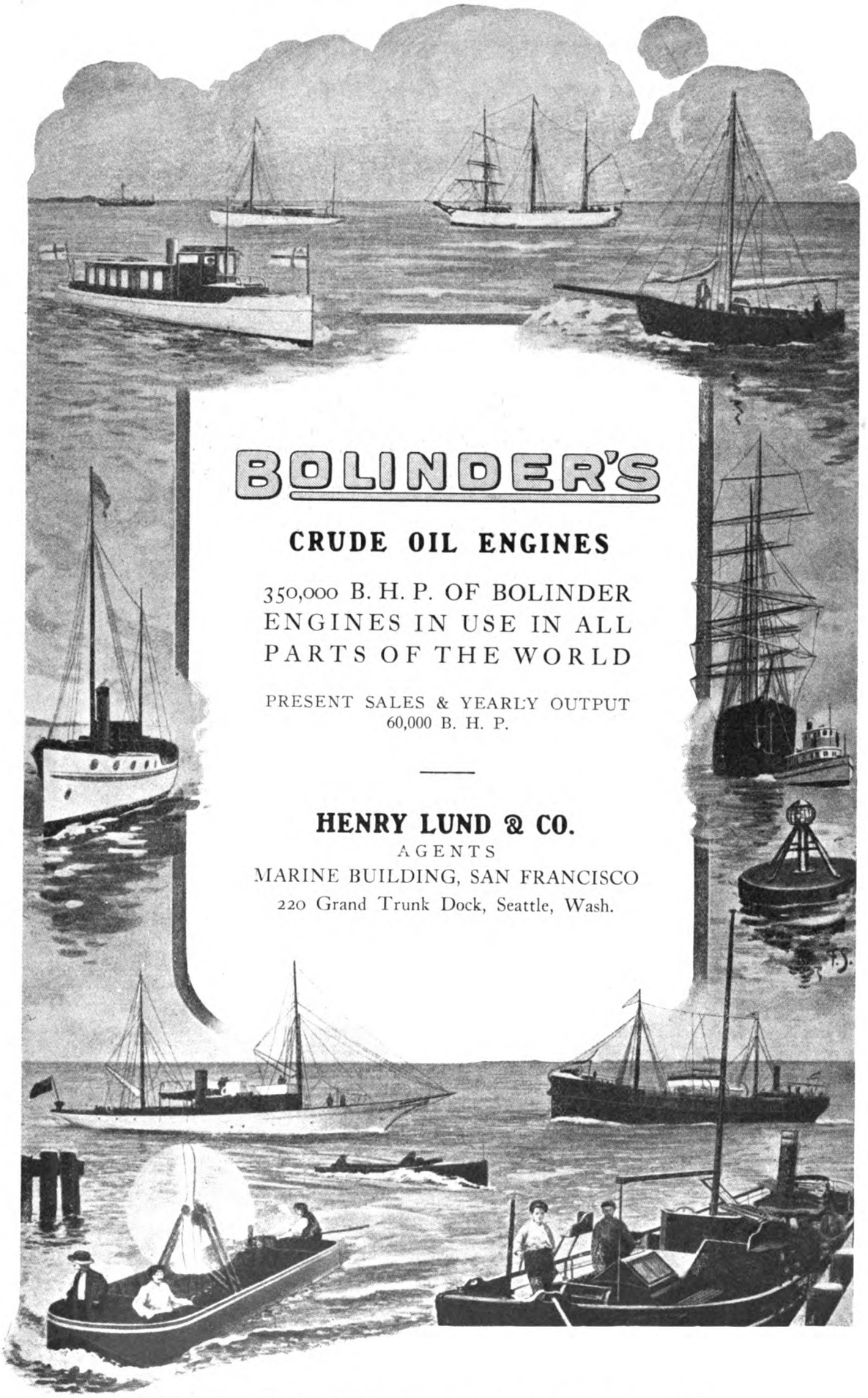
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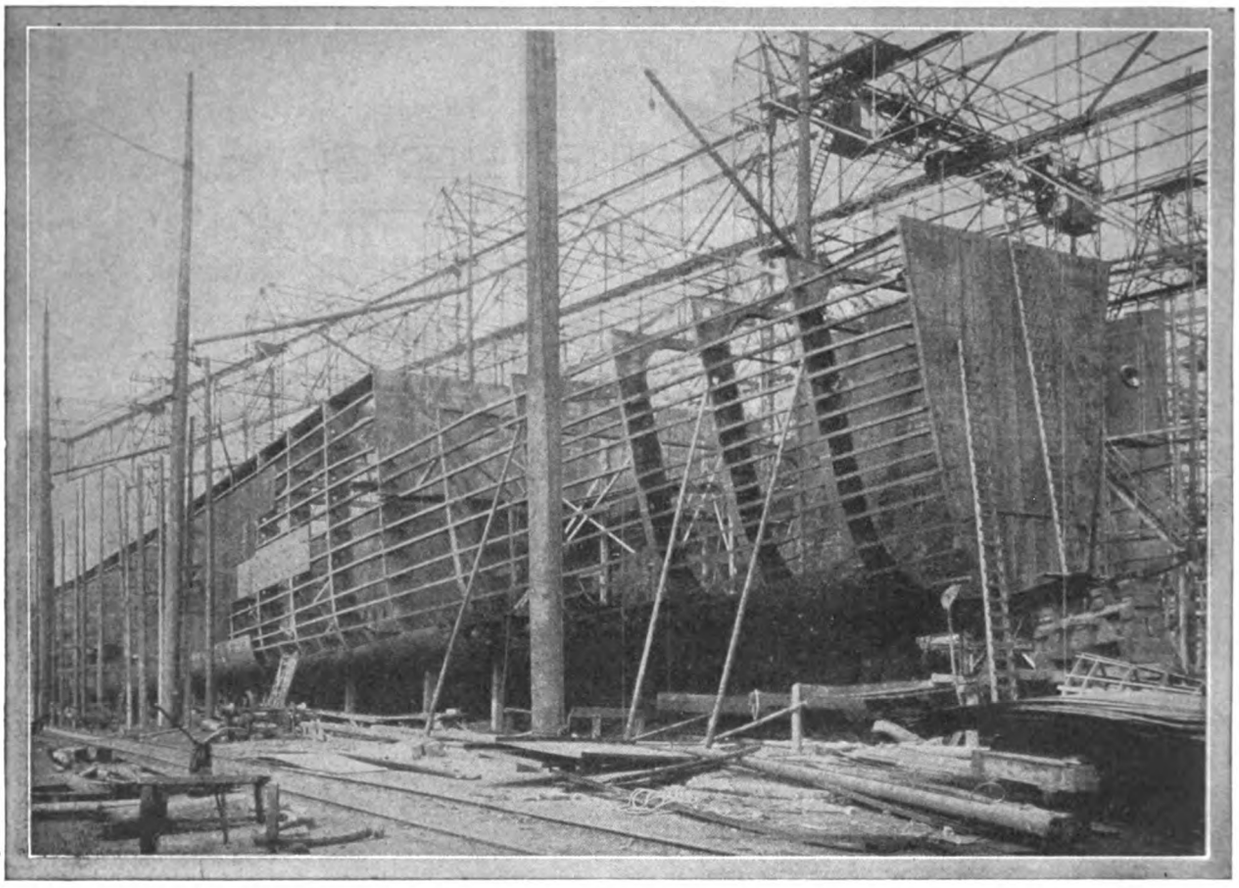


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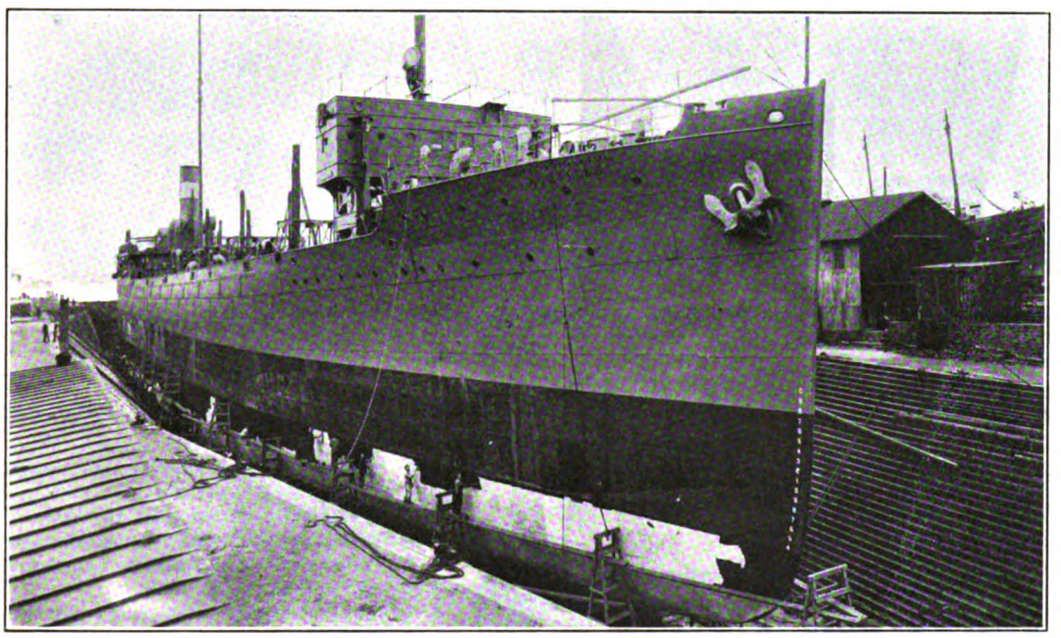
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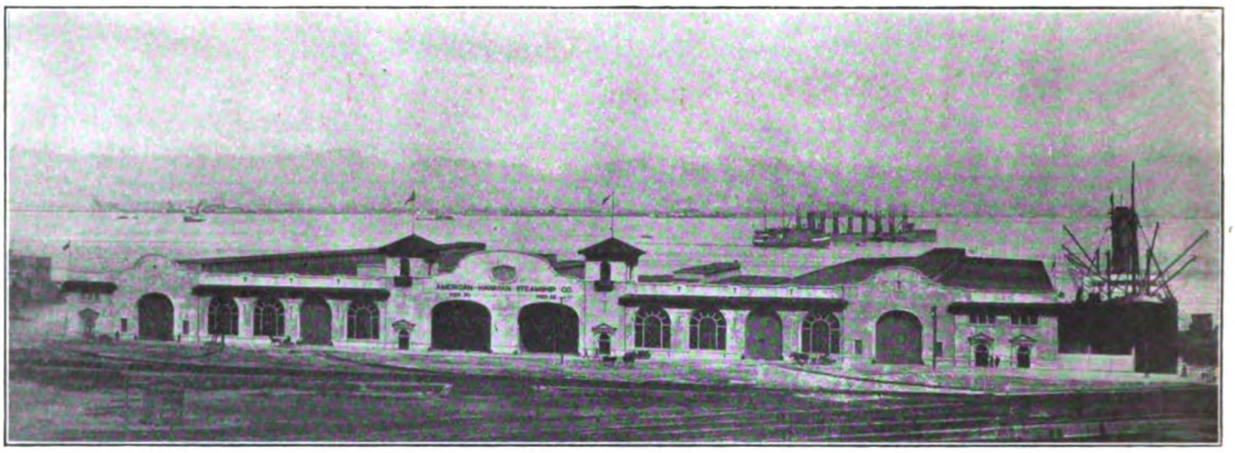
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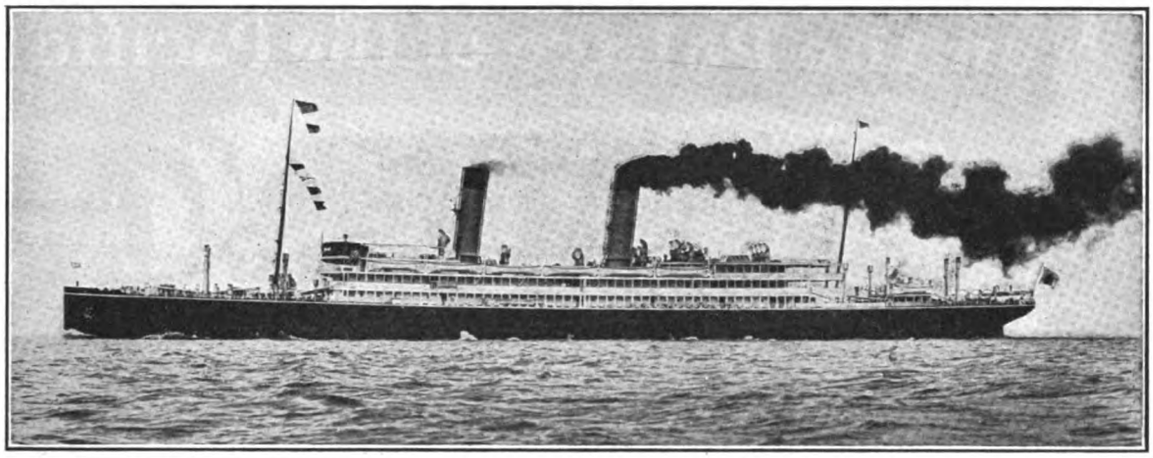
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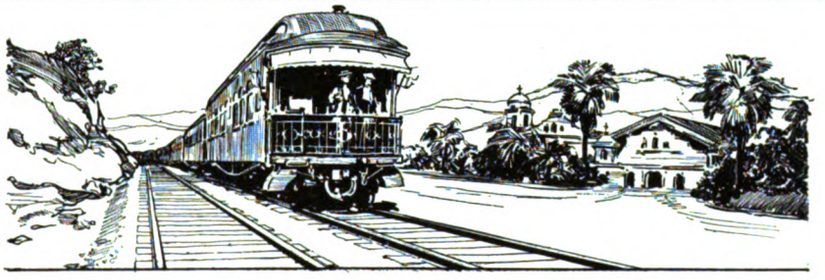
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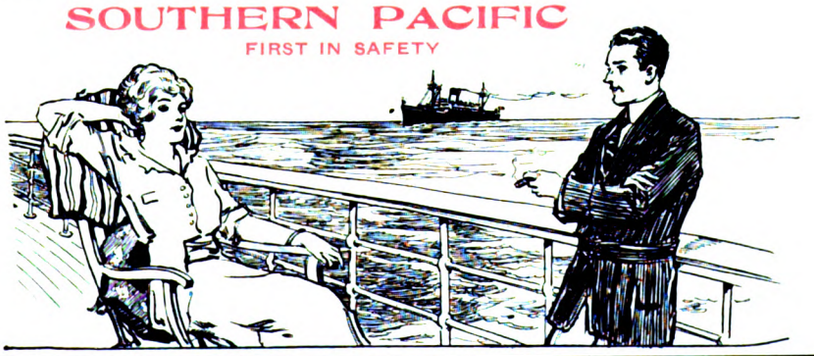
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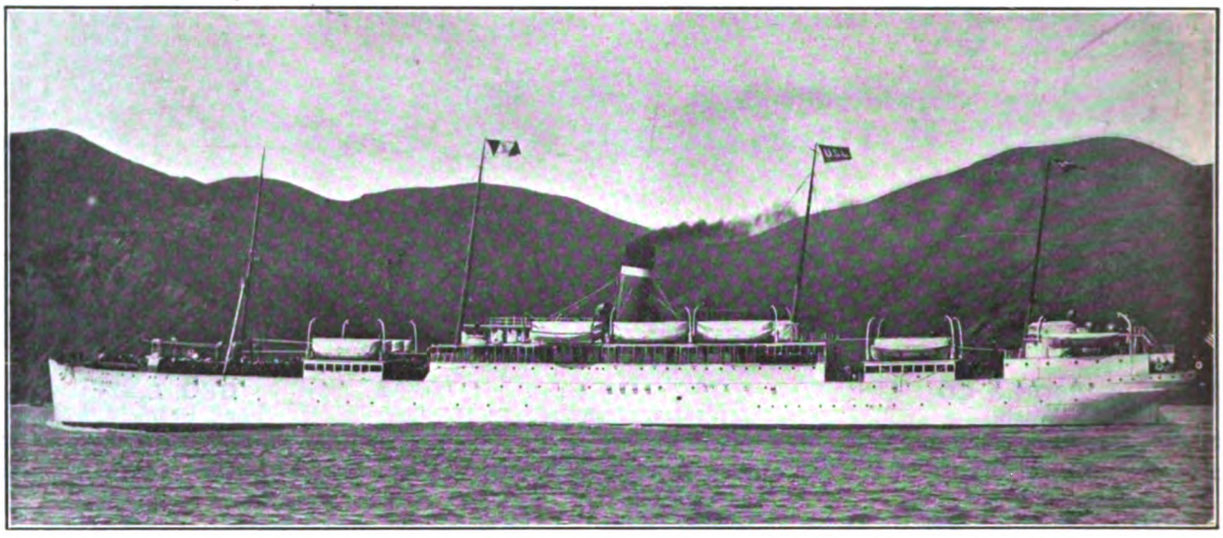


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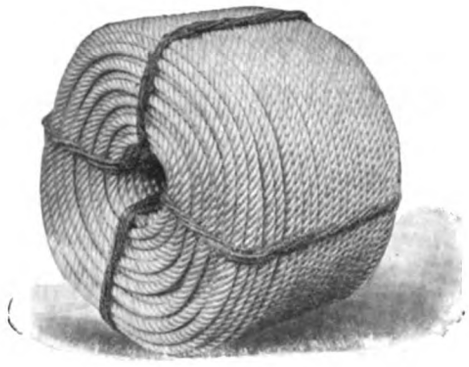
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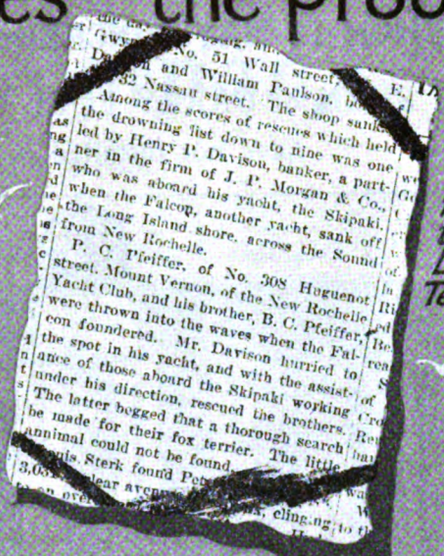
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Stronger than the gale—
COLUMBIAN PURE MANILA
Here's the proof—




Among the scores of rescues which held the drowning list down to nine was one led by Henry P. Davison, banker, a partner in the firm of J. P. Morgan & Co., who was aboard his yacht, the Skipaki, when the Falcon, another yacht, sank off the Long Island shore, across the Sound from New Rochelle.

P. C. Pfeiffer, of No. 308 Huguenot street, Mount Vernon, of the New Rochelle Yacht Club, and his brother, B. C. Pfeiffer, were thrown into the waves when the Falcon foundered. Mr. Davison hurried to the spot in his yacht, and with the assistance of those aboard the Skipaki working under his direction, rescued the brothers. The latter begged that a thorough search be made for their fox terrier. The little animal could not be found.

from the N.Y. Evening Telegram.

What the owner of the Falcon thinks.

taken home.

In conlusion, I want to say that this experience has thoroughly demonstrated to my entire satisfaction that my choice of "Columbian" Rope proved eminently satisfactory and thoroughly established to my mind the dependable quality of "Columbian" Rope, which stood the most severe service test possible without the slightest sign of failing, as every halyard and sheet was standing on the "Falcon" when she went down as good as when they were first reeved, having gone through a gale that uprooted trees, tore roofs off of houses and reported to have blown at the rate of from 80 to 90 miles an hour, with each sheet and halyard doing its full duty all the time, as we carried full sail all through the storm and driving her for all she was worth so much so that we must have nearly ripped the bottom out of the "Falcon" but there was no sign of damage above deck to either rigging, sails or hull and when we saw what the storm was going to be, thought that the worst we could do was to blow the sails away or carry out the masts, but that is just where we were fooled.

Now to give you the benefit of my costly experience, all I can do is to recommend when you order or buy rope is to specify "Columbian" quality and don't forget the snap hook for the painter.

We now have a new boat and it is needless to say she will be "Columbian" rigged. As the old saying goes - "It is an ill wind that blows nobody good."

Yours very truly,

Butler O. Pfeiffer

Columbian

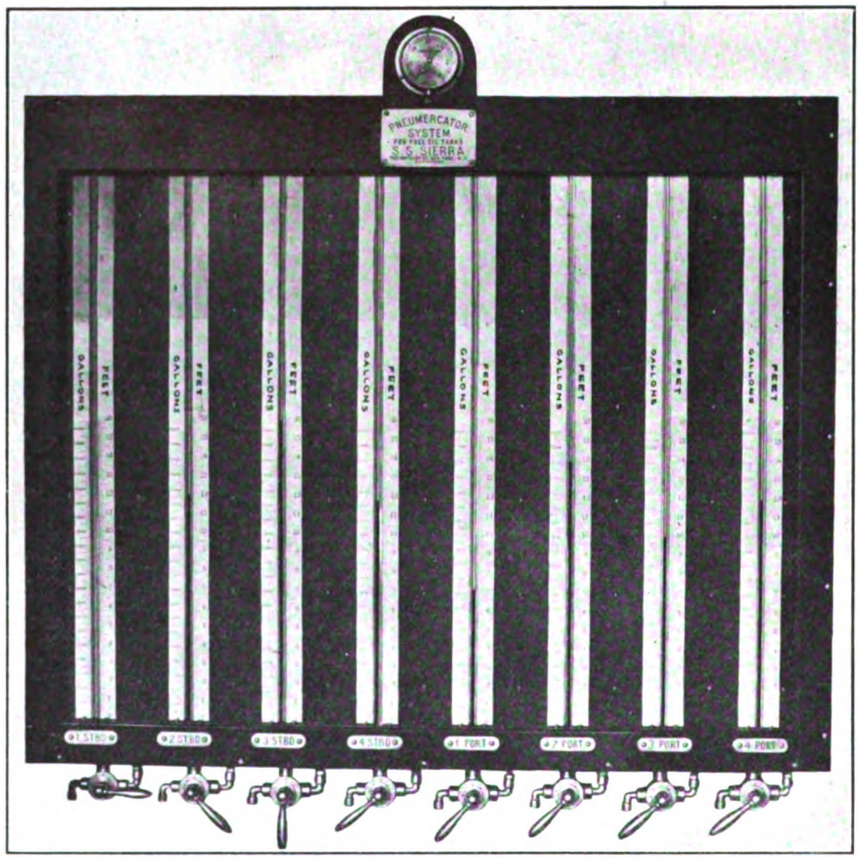
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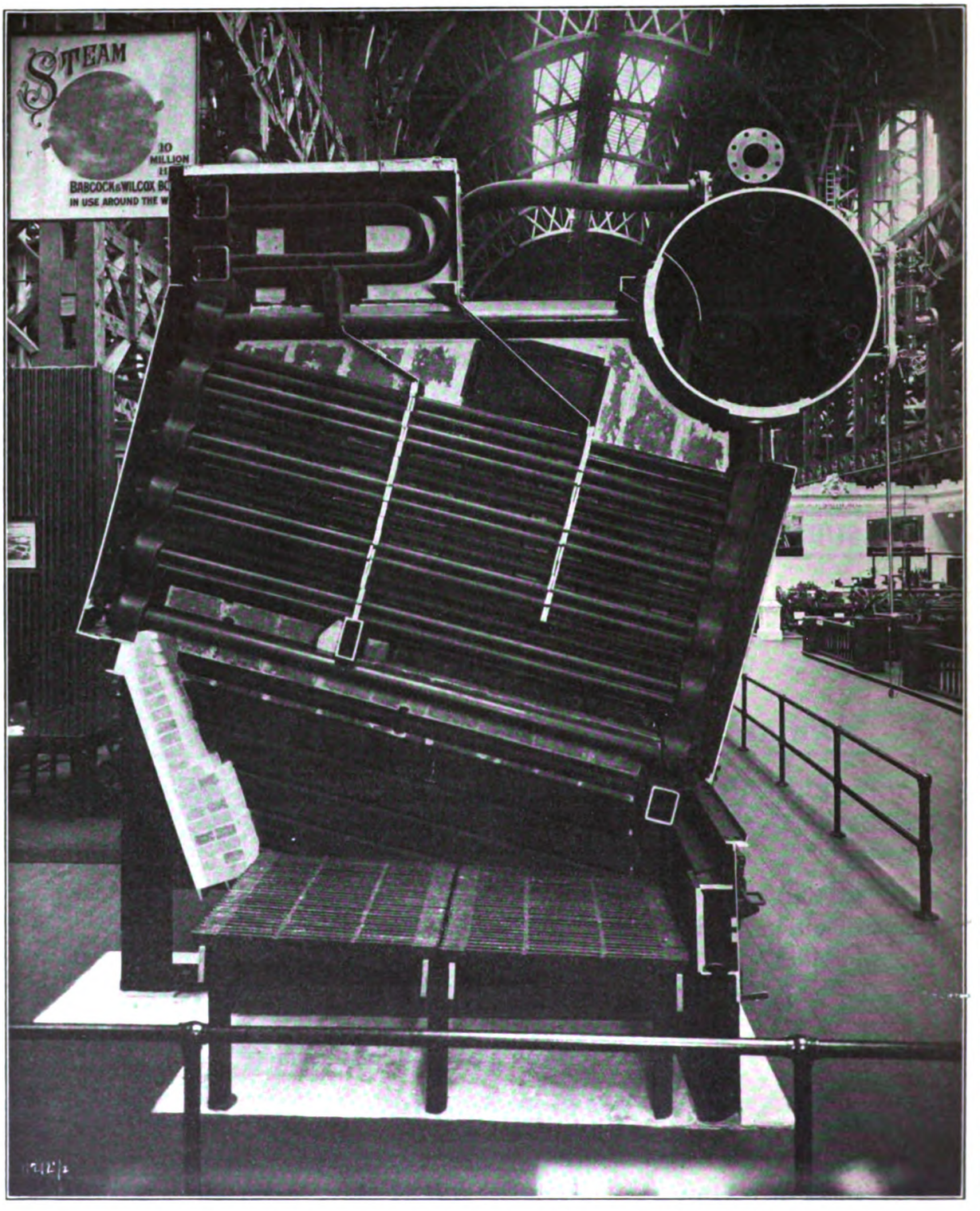
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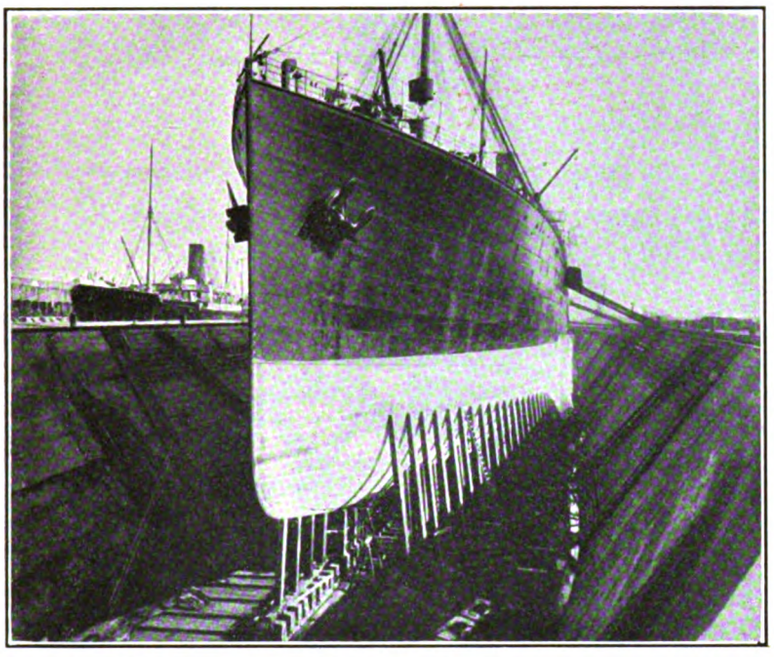
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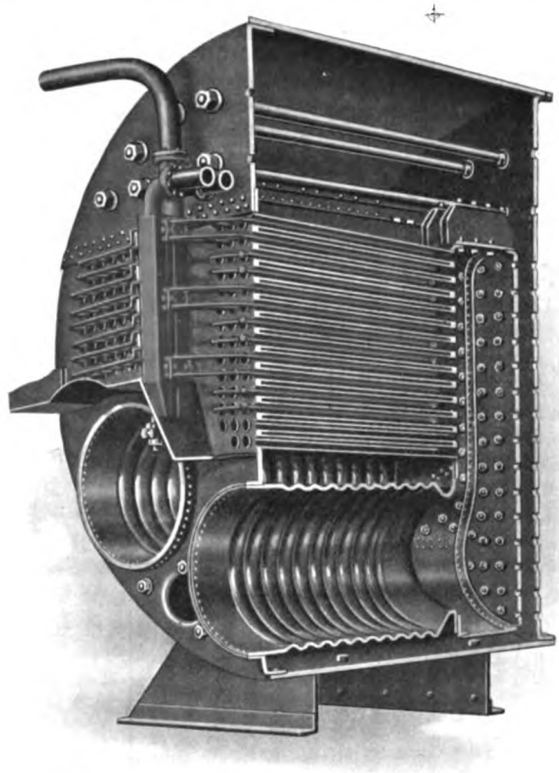
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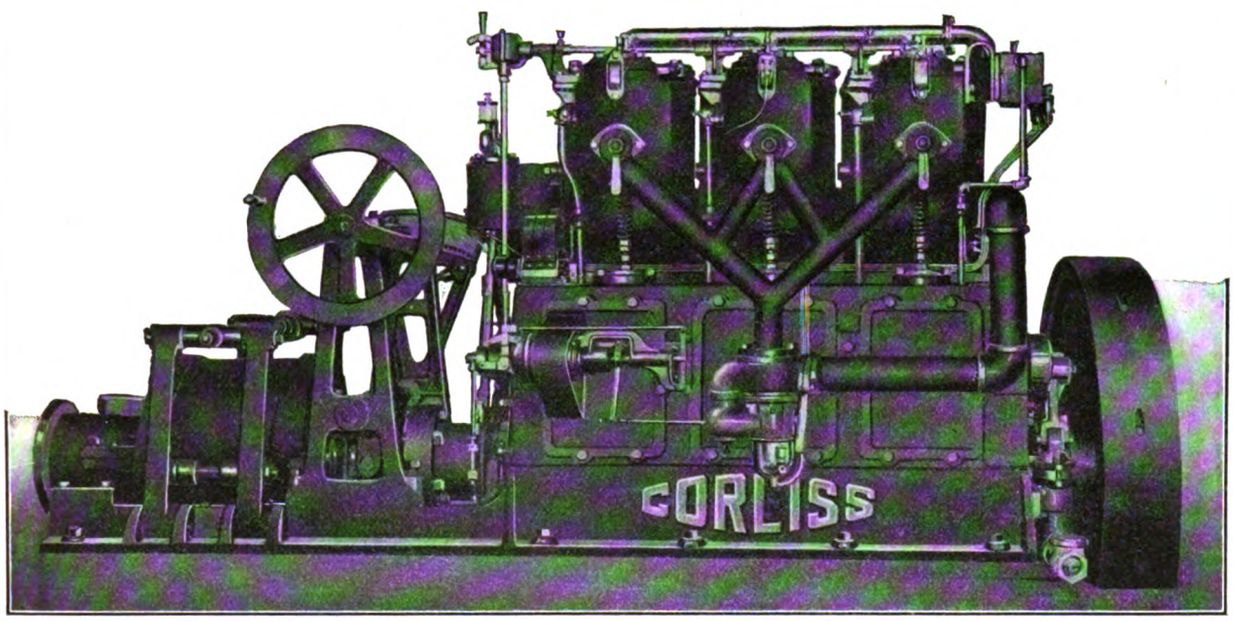
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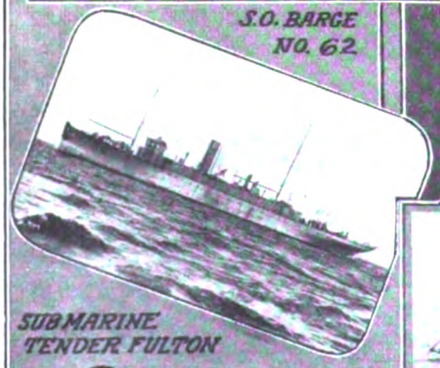
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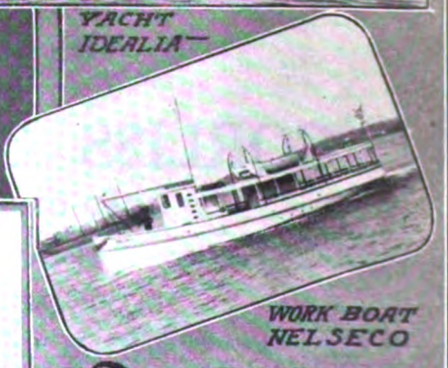




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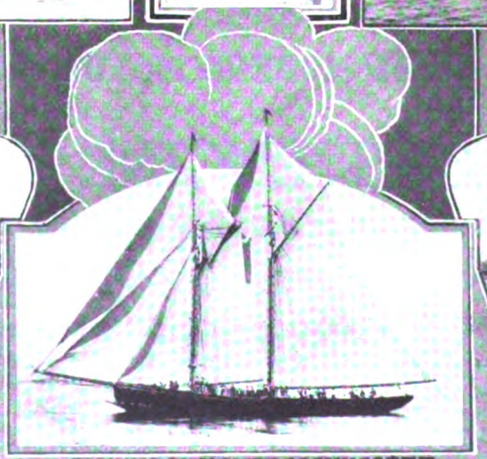
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PACIFIC MARINE REVIEW

LARGEST SHIPPING PAPER PUBLISHED IN THE UNITED STATES.

VOL. XII., No. 11. SAN FRANCISCO NOVEMBER, 1915.

"The Chinese Must Go" the Real Meaning of the Seamen's Act

THERE seems to be lurking in the minds of some who are charged with the enforcement of the La Follette's Seamen's Act the idea that the language test provided for in this bill was put there merely for innocuous purposes and not to have effective and far-reaching results.

This bill was framed by a legislative committee of organized labor of which the following were the signed members of a petition to Congress, under title of the International Seamen's Union of America:

ANDREW FURUSETH,
WILLIAM H. FRAZIER,
WALTER MACARTHUR,
Legislative Committee.

The Honorable Secretary of Commerce, Mr. Redfield, who is charged under the law with the promulgation of executive rules and regulations under which this law is carried out, seems desirous of befogging the issue and fooling the public by intimating that any old language will go on board ship. He says that the language test is understood to require the safeguarding of a vessel "in such a manner as shall be helpful and not hurtful to our maritime commerce and that it is in no sense intended to be used to create embarrassment or to cause unnecessary expense and delay." The interpretation of this language is clear, that the public should believe there was no necessity for ships having American officers speaking the English language and Chinese crews speaking the Chinese language to withdraw from a service which they had efficiently and successfully occupied for many years. He says: "Any language which is understood in sufficient measure by the officers and the proper proportion of the crew will apply." This seems a simple statement, and easy of compliance, and anyone not familiar with sea life and ship organization would take it for granted that the Secretary's instruction and explanation wipe away all the evils of the La Follette Seamen's Act as applying to the alleged impossibility of Chinese crews, under American officers, qualifying under the act as competent crews.

He does not explain that American officers do not speak Chinese and Chinese do not as a rule speak English, and the Secretary's further statement, "meaning only such orders as may be normally given to members of the crew, in each department of the vessel, in the course of the usual performance of their regular duties," is mere sophistry. No one has ever questioned the ability or the efficiency of the Chinese crews in their respective departments to perform their several duties in those departments, but the reason and the stress for the language clause in the bill, both in the arguments before the House Committee and the Senate Committee, by labor leaders and their friends, was to the effect that, no matter how efficient the Chinese crews might be in their respective departments, the grave danger arose in time of great emergency, when, it was alleged, all the crew of the ship should understand the verbal orders of the officers and be able to perform any and all duties which might be assigned to them for the purpose of saving life and, while it was not necessary for a fireman or a coal passer to perform on deck, under normal conditions, or sailors in the fireroom, all these men had to perform services on deck when all boats might have to be lowered and manned for the purpose of saving life. On this point the Secretary is silent and this point

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is the only real crux of the language test of the bill—the safety of life at sea in time of stress—and on this the Secretary naively says, knowing full well the public is not expert on this question: "Among these duties, however, should be included life-boat work or emergency work for such members of the crew as may be called upon to perform these classes of work." He must know that it takes every man there is of the crew, in all departments, to man and equip and get away the life-boats in time of stress and therefore seventy-five per cent. of the crew under the law must understand any orders of the officers, not in the normal condition of their daily avocation, but actually in a period of stress and emergency and perhaps of great excitement.

The labor leaders, as will be shown below, had no false ideas on this question when they appeared before legislative committees in Washington during the period of the arguments on this bill. The language test was put into the bill to prevent the employment of Chinese crews, after mature deliberation on their part to find ways and means to prevent the employment of a class of men who could not possibly join their unions and whom they could not possibly influence through another clause of the bill, which permits of wholesale legal desertion. Let us see what they have to say on this subject and how far they agree with Mr. Redfield.

The testimony hereinafter quoted is that given by the following men:

MR. WALTER MACARTHUR: At that time Editor of The Coast Seamen's Journal, San Francisco, California; now United States Shipping Commissioner at San Francisco.

HON. W. E. HUMPHREY: Representative from Washington and member of House Committee on Merchant Marine and Fisheries at that time; not now on that committee.

HON. ASHER C. HINDS: Representative from Maine and member of House Committee on Merchant Marine and Fisheries.

MR. PATRICK FLYNN: Secretary, Marine Firemen, Oilers and Water-Tenders' Union of the Pacific.

JUDGE RUFUS HARDY: Representative from Texas and member of House Committee on Merchant Marine and Fisheries.

HON. JAMES D. POST: Representative from Ohio and member of House Committee on Merchant Marine and Fisheries.

MR. WILLIAM H. FRAZIER: Secretary-Treasurer, International Seamen's Union of America, and Secretary of the Atlantic Coast Seamen's Union, Boston, Mass.

MR. ANDREW FURUSETH: President, International Seamen's Union of America.

HON. WILLIAM S. GREENE: Representative from Massachusetts and member of House Committee on Merchant Marine and Fisheries.

JUDGE JOSHUA W. ALEXANDER: Representative from Missouri and Chairman of House Committee on Merchant Marine and Fisheries.

Testimony by Mr. Walter Macarthur Before the Committee on Merchant Marine and Fisheries on House Bill 11372, Thursday, December 14, 1911, Page 30.

MR. HUMPHREY: I do not care whether they are native or naturalized. How many American citizens are there employed in the foreign trade?

MR. MACARTHUR: In the foreign-going trade of the United States? Not more than 5 per cent. Most of that trade happens to be conducted in ships that are manned almost exclusively by Chinese. Most of the remaining over-sea trade of the United States is carried on in ships that carry Chinese crews.

MR. HUMPHREY: It is the American sailor you are trying to help, is it not? What you want to do in this bill is to help the condition of the American sailor?

MR. MACARTHUR: Yes, sir.

MR. HUMPHREY: In the foreign trade?

MR. MACARTHUR: Yes, sir.

MR. HUMPHREY: So that this bill is designed to assist that 5 per cent. of the sailors that are now on American ships in foreign trade?

MR. MACARTHUR: No, sir; that is not the way I would state it. This bill is designed to bring about a condition in which 99 or 100 per cent. of the crews of these ships shall be Americans, native or naturalized; to get rid of these aliens in tongue, color, instinct, and everything else, and to replace them with Americans. . . .

Page 32:

MR. MACARTHUR: Mr. Chairman, on that point will you permit me to say this? The fact is, as I have stated, that the very large majority of the men engaged in the over-sea or foreign shipping of the United States are men of foreign birth and tongue and instinct. I think I am safe in saying that they are mainly Chinese employed by the various steamship companies on the Pacific Ocean. . . .

Page 34:

MR. HINDS (member of the Committee): If I understand the bill correctly, then, if you pass your bill, would not the Chinamen ship in Hongkong for San Francisco, and desert in San Francisco, and then take the American wage back?

MR. MACARTHUR: They would ship in Hongkong, if they shipped at all, just as they do now. But the purpose of this bill is to prevent the shipment of Chinese crews on American vessels, and that would be one of the effects of it, because the bill provides that 75 per cent. of the men in every department of a steam vessel shall be men capable of understanding the orders of the officers.

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Page 80:

MR. HUMPHREY: They do not have to do anything only in the employ of the officers. She has to employ American officers, and that is all. Now, then, suppose that we pass a law that would compel that ship to put on English-speaking people, people that can understand the English language, and do away with the Chinese crews, which we would all like to see done. Suppose we do that? You know and we all know that it would cost more to get an English crew than a Chinese crew. What would prevent Mr. Hill taking the English flag or other flags and continue to run and employ Chinese crews just as he is, with the single possible exception that he would replace American officers with foreign officers?

MR. FLYNN: Mr. Chairman, I am not prepared to answer a question of that kind just now, but I think, in answer to the Congressman, that there will be a speaker follow me that will be ready to go into details along that line.

MR. HARDY: Maybe you can answer another question along that line?

MR. HUMPHREY; That is all of my question, as far as I am concerned.

MR. FLYNN: I am pretty positive that there will be speakers following me that will go into that.

MR. HARDY: I want to ask you one question. Do we care a cent whether he flies——

MR. FLYNN: How is that?

MR. HARDY: Do we care a cent whether he flies the American flag or not, if his crews are all Chinamen?

MR. FLYNN: Well——

MR. HARDY: Do you care anything about that?

MR. FLYNN: I would not care what flag she flew as long as she carried Chinamen, but we contend this, Mr. Chairman, that as long as she flies the American flag, and as long as there will be American-born or naturalized Americans who are willing to follow the flag of "Old Glory," we say that they should not be allowed to carry foreigners of any description.

As an illustration of how much the individual labor leader knew of the details of this bill, a fair example may be given from Mr. Flynn's testimony, page 82. Mr. Flynn was at that time Secretary of the Marine Firemen, Oilers and Water-Tenders' Union of the Pacific. Mr. Hinds was discussing the question of wages paid Chinese on English vessels, in regard to whether they got 35c or 40c a day.

MR. FLYNN: No; I do not suppose it would.

MR. HINDS: About what would it be?

MR. FLYNN: But I wish to state, in answer to that, Mr. Congressman, that the speaker that will follow me will demonstrate to you where this competition will put the American ship on the same basis as the foreign shipowner if this bill is enacted into law; *but I myself, of course, do not come here to go into all the details of the bill, because I would be arguing about something* THAT I PRACTICALLY KNOW NOTHING OF.

MR. POST: What is the comparative efficiency between a Chinaman and an American?

MR. FLYNN: Our contention is this: that the ship is not properly manned because they cannot understand the orders that are given them in the English language; and by that we are able to meet all the emergencies that may arise. We can be depended upon in cases of emergency to act for ourselves without orders from our superior where they would not. It has been demonstrated—and it has been handed down by decisions of the Supreme Court of the United States—in every instance where they have carried Chinamen they have turned out to be absolute cowards, and instead of trying to assist the passengers, particularly the women and children, they have turned to and crowded them out and tried to get in the boats themselves first.

Mr. Flynn stated he practically knew nothing about the bill, and his further testimony in regard to the decisions of the Supreme Court showed that he did not know what he was talking about in relation to the cowardice of the Chinese.

The testimony of Mr. Frazier, Secretary-Treasurer of the International Seamen's Union of America and Secretary of the Atlantic Coast Seamen's Union, Boston, Mass., page 89:

MR. HUMPHREY: They complied with the law in regard to the number of Americans that should be employed?

MR. FRAZIER: They make that up out of the steward's department and the officers. As to the question by the honorable gentleman relative to the employment of Chinese on the West coast, I want to say this: We do care what crews are employed on American ships. We do not want to see Chinese on any of the ships carrying passengers, unless manned by Chinese officers, and the competition will not be keen under this bill, but we are endeavoring to eliminate competition with the foreign ships, insomuch as the foreign ships coming into a port with the Chinese crew—we are asking you to make her carry a crew away that will understand the orders of the officers.

Are there any questions?

We are asking also to apply this bill to the foreign vessels as well as American vessels.

MR. ANDREW FURUSETH (President of the International Seamen's Union of America) (page 95): One of the questions that has been asked is, What will be the result to the American shipowner if this bill is passed, placing them on an absolute equality as to the obtaining of crews in American

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harbors? The effect of this bill, if enacted, will be that the foreign shipowner who comes here with a crew that cannot understand the language of the officers of that vessel—that is to say, if the German, English, or American vessel comes here with Chinese, Japanese, or Hindu crews they will have to discharge those crews and hire somebody else who can understand the language of the officers.

Page 97:

MR. FURUSETH: I will explain to you what is in the bill if you will give me an opportunity. First, I will explain to you what is the situation now and then I will explain to you what we are trying to do to change that situation. Here is the situation at the present time: A German vessel goes out to China; she dismisses her German crew in Hongkong, takes on a Chinese crew on the deck at $7 and at $9 in the fireroom. She comes to the Pacific Coast. She is a German steamer that is able to carry 4,000,000 feet of lumber. . . . She takes 4,000,000 feet of lumber away from Tacoma to the west coast of South America. . . .. What we say is this: That a vessel that has that kind of a crew is so utterly unseaworthy that she is not only a danger to herself but to every other class of vessel that she meets. She is a derelict in point of fact. . . .

Page 100:

MR. GREENE: What effect would that have on the Chinese crews that come here, if you are going to turn them loose?

MR. FURUSETH: The Chinese crews are under the Chinese Exclusion Act.

MR. GREENE: You have not made any provision for that.

MR. FURUSETH: The Chinese Exclusion Act is an altogether different law. If it comes right down to it, Mr. Greene, the men (Chinese crews) are carried on the American vessels in violation of existing law, and if we could get the State Department of the United States Government to act, we could have thrown them out, because the United States ship is American soil.

MR. HUMPHREY: It would not make any difference in the Chinese case, because they would not permit them to come ashore.

MR. FURUSETH: No; because of the Chinese Exclusion Act.

THE CHAIRMAN (Judge Alexander): Suppose you did not let them come ashore. Suppose a foreign vessel comes here with a Chinese crew. We provide that they shall not leave an American port with a crew that cannot speak the language of the officer.

MR. FURUSETH: They will have to get Chinese to go back.

MR. HUMPHREY: They would not come, in the first place, because they could not put the Chinamen ashore. They would not be permitted to do that, so they would not come at all.

THE CHAIRMAN: The effect would be to exclude the Chinese.

Pages 105-106:

MR. HUMPHREY: I want to ask you a question which I asked the gentleman a while ago, because I know that you know more about this question—although you seemed to think a while ago I was antagonistic—I pay you the compliment that I think you know more about shipping generally than any man that has ever been before this committee. I want to ask you about the "Minnesota," as an illustration of all the vessels on the over-sea trade. Suppose we would pass a law prohibiting American vessels employing Chinese crews—that is what it would amount to?

MR. FURUSETH: That is what it would amount to.

MR. HUMPHREY: And foreign vessels were not compelled to obey that same rule of law, what would prevent Mr. Hill from immediately putting on a foreign flag—a British flag, for instance—and continuing to carry Chinese crews just as he does to-day?

MR. FURUSETH: If you did make this (Wilson Seamen's Bill, under discussion) applicable to the foreign nations, he could not do so.

MR. HUMPHREY: That is what I am trying to get at.

MR. FURUSETH: Therefore I say you should make it applicable to foreign nations.

MR. HUMPHREY: But as soon as we do that, it won't be effective.

MR. FURUSETH: It won't be effective, because he can change his flag to the English; that is to say, he can change his flag to the English, if he wants to, and he can make such an arrangement as still to take control of his vessel, which is in this day somewhat of a doubt. I am satisfied that he would not change it to the Chinese, and if you pass this bill it is the only kind of a flag that he can take and continue to carry Chinese.

MR. HINDS: Would it be a practicable thing for these vessels to gradually introduce officers that could use the Chinese language and get around the provisions?

MR. FURUSETH: We would like to take the chances, Mr. Congressman, of American officers learning to speak Chinese in order to sail with a Chinese crew; we would like to have that opportunity and we would like to have it hastily.

MR. HINDS: How about American missionaries?

MR. FURUSETH: Say, I don't want to talk about missionaries. For the love of God, I don't want to talk about missionaries, or I will lose my temper. I have met too many in the world.

No American citizen of average intelligence, after reading the above, can come to any other

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conclusion than that which this testimony proves and that is, the desire on the part of the labor leaders to abolish Chinese crews; this not only upon American ships, but upon the ships of all nations. How is Mr. Redfield to square himself with the power of the labor leaders who framed this bill, forced it through Congress and compelled the President to sign it, regardless of results to the maritime interests of the United States? We leave it to the public and our readers to decide.

PACIFIC OCEAN SHIPPING ADJUSTMENT.

By CONSUL-GENERAL GEORGE E. ANDERSON, Hongkong, Sept. 4.

(Extract from Commerce Reports: Daily Consular and Trade Reports, issued daily by the Bureau of Foreign and Domestic Commerce, Department of Commerce. No. 243. Washington, D. C., Saturday, October 16, 1915.)

The readjustment of shipping on the Pacific Ocean made necessary by the withdrawal of the Pacific Mail Steamship Company's services has been further developed by the sale of the S.S. "Persia," one of its vessels sailing under the British flag, to the Toyo Kisen Kaisha, the competing Japanese line, which is to take the vessel over at the end of its current voyage to Hongkong. The service of the Pacific Mail to the Far East therefore ends abruptly with the arrival of the "Persia" in Hongkong October 11. This sale gives the Toyo Kisen Kaisha five ships for the transpacific service. Efforts to secure further tonnage for such service so far have been unsuccessful.

The effect of the change in service on passenger traffic already is apparent in some respect, for, in spite of the dull season, passenger accommodations already are difficult to secure. The effect of the contraction of the service is likely to be felt more acutely during the autumn in sailings from America rather than sailings from Hongkong, though vessels from Hongkong already are practically fully engaged.

New Freight Rates.

What the ultimate level of freight rates on the Pacific as a result of the recent changes and the general contraction of available tonnage will be is a matter of considerable uncertainty, though all shipping experts in this part of the world declare that a marked advance in rates is inevitable and imperative, and the only question is as to how marked the advance will be and what ultimate level will be reached.

The latest actual announcement in this connection is that of the Osaka Shosen Kaisha as to an advance in freights on American products shipped from Tacoma and Puget Sound ports to the Orient. This advance on American produce in some respects is significant. The rate announced is one of $5.50 gold on flour anl wheat to Japan and $6 gold on the same commodities to Manila and Hongkong. The rate on lumber is to be $9 to Japan and $11 to Hongkong and Manila per 1,000 board feet. The rate on dried fish is to be $6.50 to Japan and $7.50 to Hongkong and Manila per measured ton. These rates are well toward twice the rates obtaining on the same commodities before the opening of war in Europe.

The chief significance of the rates, however, lies in the fact that it is on American freight outward rather than on Japanese freight homeward that the advance is made. The fact of the matter is that advances on Japanese freight homeward are probably to be comparatively few and of slight moment. Heretofore in all advances of rates by the Conference lines the Japanese Government, controlling the Japanese lines by the subsidy paid them for their services, has prevented marked advance in homeward rates on freight in which Japan was interested. This policy is undoubtedly to be followed in the coming readjustment. In other words, the Japanese interests, through the subsidies paid their lines, are to control rates for the benefit of Japanese trade.

Disappearance of Competition.

The control of rates to the advantage of Japanese trade is to be practically absolute, for Japanese lines dominate the situation in the Pacific absolutely. Of the 490,000 tons or so of available tonnage in all transpacific service available after the withdrawal of the American line, probably 430,000 tons are Japanese, all controlled wholly, through subsidies, by the Japanese Government. It is becoming quite evident, therefore, that all other trade in and with the Far East is to be under Japanese control. With the full pinch of the shortage of tonnage experienced, it is becoming more and more evident that no Chinese cargo or through cargo transhipped at Hongkong for the United States by way of the Pacific can be expected from Hongkong until all cargo has been carried from Japanese ports. Naturally the rate of freight to be charged on all such cargo will be all that the traffic will bear, while at the same time freight from Japan will be carried at present rates or at comparatively slight advance.

One result of this situation is the general understanding among shipping men that the service of Japanese ships between Japan and the United States will be accelerated and strengthened so as to fill gaps caused by the disappearance of the Pacific Mail steamers from the route, the result being that steamer service between Hongkong and Japan and Hongkong and the United States by way of Japan will be weakened and become more of a local service for the time being. Announcement to this end is anticipated shortly.

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A factor in the situation which is likely to be of great importance in that it will prevent the transfer of Japanese or other ships to the Pacific trade is the increasing demand for tonnage from the Far East to Europe. So far, as present indications lie, no relief for the transpacific situation is in sight in the transfer of vessels from other parts of the world.

CORRECTION: The Consul-General desires that his article on "Crisis in Shipping on the Pacific," in Commerce Reports for September 30, 1915, on page 1524, in the middle of page, should read: "The Osaka Shosen Kaisha, two sailings per month," etc.

English Press Taking Notice

JUST how the English press is disposed towards the Seamen's Act may be gathered from the following articles which appeared in the Syren and Shipping Illustrated of London of September 22nd:

Mr. Furuseth will be remembered by our readers as the gentleman who, being one of the American delegates to the Conference on Safety of Life at Sea, went home in a huff soon after the proceedings had opened. Mr. Furuseth, it appears, is an ardent supporter of the license to desert which is conferred under the (Seamen's) Act. He evidently regards that arrangement in much the same light as we in England regard the Magna Carta. "It was suggested," he says, in dealing with the failure of previous measures to put matters right, "that the fault was with our treaties with foreign nations, under which treaties we are using our police power to keep the wage cost of our competitors below our own. Men are shipped in the Mediterranean, in the Baltic or in the Orient at the wage ruling there; the men are, on pain of imprisonment, compelled to fulfill their contracts to labor, and the vessel takes away cargo and passengers from our ports at the wages of Fiume, Riga or Hongkong. Nothing but a very big subsidy could overcome such handicap unless we can cease arresting, detaining and returning deserting seamen; unless we cease to execute the fugitive slave law that exists as between nations with regard to seamen. When the seamen are permitted to release themselves from the vessels upon which they are serving, and are thereby placed in position to demand the wages of the port, the difference in wage will gradually but automatically cease." There is something akin to greatness in the remarks which we have just quoted. Mr. Furuseth makes no apology for a system which will enable men to break with impunity the contract into which they have deliberately entered. Indeed, the idea that a contract should be sacred does not seem to enter into his calculations at all—so far, at least, as the engagement of seamen is concerned. We have a shrewd suspicion that if anyone who had entered into a written agreement with Mr. Furuseth were to claim the right to tear the document up our friend would be vastly indignant—but that, of course, is another matter. The true labor leader, be he British or be he American, always has two laws—one for himself and one for other people. To compel a seaman to fulfil the bargain to which he has set his hand is, it seems, to "execute the fugitive slave law." It is rather difficult for the ordinary mind to perceive the resemblance between a fugitive slave and a man who, of his own free will, has pledged himself to render certain services, but not everyone, of course, is gifted with the powers of vision of a Furuseth. Gentlemen of that kidney can see things which are invisible to other people. By way of compensation, perhaps, they are blind to things which are clearly visible to others. They can see nothing shameful in actions which, to lesser minds, appear the acme of shamefulness—such, for instance, as the cool repudiation of a contract. Note the elegant manner in which Mr. Furuseth speaks of desertion: "When the seamen are permitted to release themselves from the vessel upon which they are serving." A phrase like that deserves to live. It is euphemism brought to the pitch of perfection. It has been contended that Japanese seamen will not desert, and that Japanese vessels will thus enjoy an advantage over others, but Mr. Furuseth does not hold with this opinion. He believes that the Japanese seaman will be as unscrupulous a scoundrel—we beg his pardon; will be as ready to "release himself" with the aid of the American Government—as any other mariner, and that the Japanese will take no steps to punish deserters when they get home again. Whether this view is correct is a question into which we will not enter, except to remark that the arguments which Mr. Furuseth produces in support of it are as unsound as his business morality.

In winding up, Mr. Furuseth says: "If the United States has any real desire to get back upon the ocean, if there is any desire to participate in the sea power and in the wealth that comes from marine transportation, the American must be induced to go to sea, and he will not go upon old conditions." There is a certain amount of contradictoriness here; a tendency, if we may say it, towards confusion of thought. If Mr. Furuseth desires that Americans shall be induced to adopt the sea as a calling, why is he so delighted at the idea of encouraging foreign seamen to desert in American ports with a view to competing with the native element?

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Upper left shows the excitement of dropping fishing dories overboard from a trawler under full headway. Upper right is a Burmese surf boat and below a submarine of the Grampus type surface running on San Francisco Bay. Lower left: looking down from the bridge of a freighter bucking into heavy seas. Lower right: looking out through the hole in the bows of the steamer "Thode Fagelund" after collision with a large German craft.

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Captain Dollar on the Foreign Trade Situation

PERHAPS no living American has been so long actively engaged and consistently championing the cause of an American foreign trade merchant marine as Captain Robert Dollar, and his many years of experience as a merchant, steamship man and deep sea trader, coupled with the fact that his publicly expressed views on shipping and kindred matters have never varied from the policy which he believes will place the American flag once more upon the ocean, makes his views of especial value at this time when legislation is threatening with extinction the feeble remnants of a once proud institution,—the American foreign trade ship. In a recent interview with Captain Dollar by Edward Marshall for the New York Times, the Captain stated, in part, as follows:

We are confronted with enormous opportunities and if we do not take advantage of them world conditions cannot be blamed; our own intelligence will be at fault. We have before us an unprecedented chance for foreign trade and foreign trade is the surest guaranty of any nation's prosperity. I don't believe we will let it slip.

Personally I am confident that the next Congress will adopt such measures as may be necessary to the development of an American merchant marine, and as soon as that is done our foreign commerce will spring into proportions which could not have been possible without the European war.

The war has created an extensive commerce in munitions, other than fighting munitions, which has been more than sufficient to offset the commerce which the conflict has kept off the seas.

We have been uniquely situated in the past. Our production has never far exceeded our own demands, so we have not greatly needed foreign trade. Hence we have never seriously studied the art of getting and keeping it.

Only a few years ago it became apparent that conditions had begun to change and that continued national prosperity would necessitate our entrance into competition with the other great producing nations for world commerce.

But we were in the habit of an insular prosperity and could not adjust ourselves readily to this fact. Our legislators have stupidly failed to revise shipping laws and inspection requirements which made it impossible for American vessels to operate successfully in foreign trade. Now has come the La Follette Bill which caps the climax.

As soon as the war began, various statements were made as to the enormous gains which would accrue to American shipping as soon as foreign bottoms were scared from the seas. This did not occur; first, because we had no ships worth mentioning; second, because those which we had were governed by restrictions making them unprofitable; and third, because the ocean war was so uneven that the commerce-carrying vessels of one country only suffered. Those of France and England remained practically free to sail and trade as they never before had sailed and traded. And remember, we but recently had handicapped ourselves.

The war, however, has been a great educator, and the next session of Congress is bound to remedy some of our old mistakes, adjusting affairs so that we will be able to take some advantage of our opportunities before they pass into history.

The opportunity in South America is very great. We are her logical source of supply. Since her European trade has been shut off we have built up a considerable trade with her and as soon as we get ships it will grow rapidly.

As soon as we get ships we will find that every one of them will create trade in both directions. Take the experience which my own firm has had. It is the rule in our far eastern offices to cable the home office when one of our vessels has discharged in an Oriental port, and there has found herself without a cargo for the homeward voyage. Our representative lets us know how much more cargo the ship has room for and tells us what can be bought there on the ground. We will say that she can buy hemp at Manila as a certain price. If this can be sold at a sufficient price in the United States even to pay reasonable freight rates, it is wise for us to buy it, is it not? See how the vessel has acted as a trade missionary?

Our ships have developed a nice little pig-iron trade between China and this country, having been stimulated to the task by the fact that they had no cargoes to bring home after they had discharged those carried westward. We sent cargoes to the Philippines some years ago and in order to make the voyages profitable brought copra back with us. Previously no trade in copra with the Philippines existed. Now it amounts to from 20,000 to 30,000 tons a year. We are now developing Philippine mahogany along the same lines, bringing 4,000,000 feet a year in our own ships. It does not yield a profit yet, but later on it will. Our ships which bring it are trade missionaries.

If we did not have the ships we could not do these things and the whole country would be the loser. If we had more ships we could do more things of this kind and the whole country would be the gainer. If many shipowners were doing similar things the national effect would be tremendous. If our laws encouraged enterprise this would be the case.

The man on the street who considers ocean commerce is likely to forget that if we bring we must

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take, and if we take we must bring. A vessel traveling in ballast one way must get double freight the other.

There is no good reason why this nation should not be prosperous at the present time as never before. With the unparalleled decrease of foreign bottoms and the total cessation of commercial shipbuilding in belligerent nations and with the stoppage throughout Europe of commercial manufacture, our mills and shops should find themselves faced with a constructive task such as never came to them before.

We must very seriously consider this matter of foreign trade as it is of importance to every human being in our territory. I think those interested should be mentioned in this order: First the farmer, second the manufacturer, third the merchant who has branches in foreign countries, fourth the banker who furnishes exchange, and fifth the shipowner.

When banking facilities abroad were ended and ships were frightened from the sea, the farmers found themselves with a great surplus and learned with a sharp shock that this is a small world, in which the ill-fortune of any considerable population must affect the prosperity of the whole, unless that whole is really prepared to meet emergencies.

Our manufacturers were as self-complacent and wrong as our farmers. Secretary of Commerce Redfield has declared that our factories running at full capacity for six months out of every year would supply all our needs. This means that foreign trade gives employment to half our capital and half our labor employed in manufacture. See how this brings home the problem of our shipping to the working man? No foreign trade or an undeveloped foreign trade means poor business for our manufacturers and high prices for our home consumers.

If we wish American trade to grow we must have not only ships to carry our commerce, but they must be American ships, as that will mean the existence in foreign ports of American branch houses fighting for the world's business. Some of our manufacturers employ foreign houses to act as agents for them, but this is poor business. Foreign agents will work for our prosperity but half-heartedly, if at all.

The situation, as it stands, is an absurdity and would be a tragedy were we not capable of correcting our mistakes with a rapidity and thoroughness which exceeds the capabilities of any other nation in the world. Already we are waking to the fact that we must do our own banking. For example, England has controlled all Oriental business. Our Pacific Coast has done business with China and Japan through London.

To-day, New York is temporarily the financial center of the world. If we are reasonably intelligent it will so have established its advantages and its prestige by the time the war ends that the cessation of hostilities will not alter this condition. We already have the farmers and the land, the manufacturers and the raw material, now we must have the American merchant with the foreign house, the American bankers to finance exchange (in dollars, not pounds) and American ships with which to carry commerce.



The "Erskine M. Phelps." Once a great number of such ships sailed on every ocean under the Stars and Stripes.

Another thing: American ships can carry American cargoes, under reasonably equal conditions, cheaper than anybody else can carry them. I am a shipowner, we will say, living in New York. Could I carry freight to and from another port as cheaply as I could carry it to and from New York? Of course not, for if I live in New York I shall be on the ground there, my ships normally will dock there, my offices will be there, my trusted men will be there, there will be less chance there of mistakes in my business than elsewhere. Is it not obvious that the cities and nations which are the residences of the shipowners and the home ports and nations of the ships will get the trade? It seems so to me.

Our Government has done something to develop its foreign trade. It has had wonderful consular reports and has done fine missionary work abroad. But it has done little or no missionary work at home and that is what we need. If our Government would select one merchant or manufacturer in each of the lines promising the best foreign trade development and see to it that his interest was aroused, he would straightway become a home missionary. It takes

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the product of many factories to make the cargo of a ship. So it is to the interest of every business man who wants foreign trade to see to it that his neighbor wants it too—and to see to it that he gets it if he can.

I arrived in China just after the revolution started a few years ago. I told my son there would be no Chinese business and he said he had been thinking of the Philippines. I went to Manila and was met by Governor Forbes, who put a steamer at my disposal and assigned a man to take me round the islands. I kept the steamer and the man 16 or 18 days, and it meant American trade. From Zamboango I cabled home for a big steamer to come out and load with copra and mahogany. It did so, and an absolutely new American trade was established.

Was Governor Forbes the missionary? No. Was I? No. Was the ship? Yes. Governor Forbes' efforts and my own would have been futile if there had not been an American ship waiting at the other end of the Pacific cable. Many ships have gone since then and many more will go. There was a case in which our Government cooperated with a private individual in working for the public good. There should be more of this.

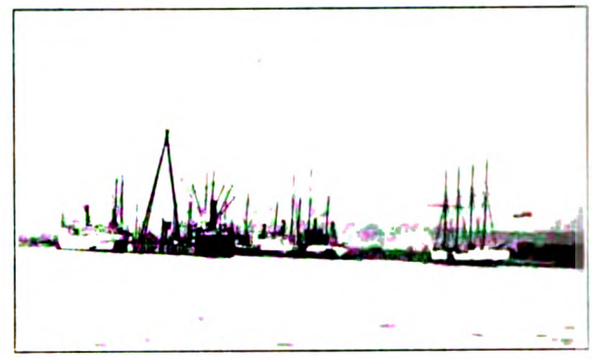
I have said the farmer has an interest in ocean shipping. Was not this startlingly illustrated when the cotton crisis came? Is it not strikingly illustrated now when we have bumper crops of grain? If we raise more than the domestic market can absorb it must be moved to foreign markets. It can only be moved in ships. If we have not ships it cannot move and if it does not move of what value is it to the men who produced it?

The fellow that has the transportation comes near to being the master of the situation. Have we not all learned that on land in dealing with the railroads? He must be comfortable. If we bother him too much we all shall lose by it. Don't let him take advantage of you for that will hurt you both, but do not unduly oppress him.

We ought not to wait until the war is over, the markets of the world are open to us now. Our first chance now exists for putting our men in the foreign field. We need foreign trade. We have never really needed it before. We can get it. We never before have had so favorable an opportunity.



Oakland Creek is often full of steam and sailing lumber schooners



A busy scene on Oakland's waterfront.

We must be far-sighted if we wish to be really prosperous. We had not studied carefully the South American situation. We had been buying, but not selling there. We had allowed the money which we spent there to be re-spent in Europe.

Among truly prosperous nations the balance of trade must be about equal. We must try and equalize our balance of trade with every nation on earth and we never can do that until we are shipowners.

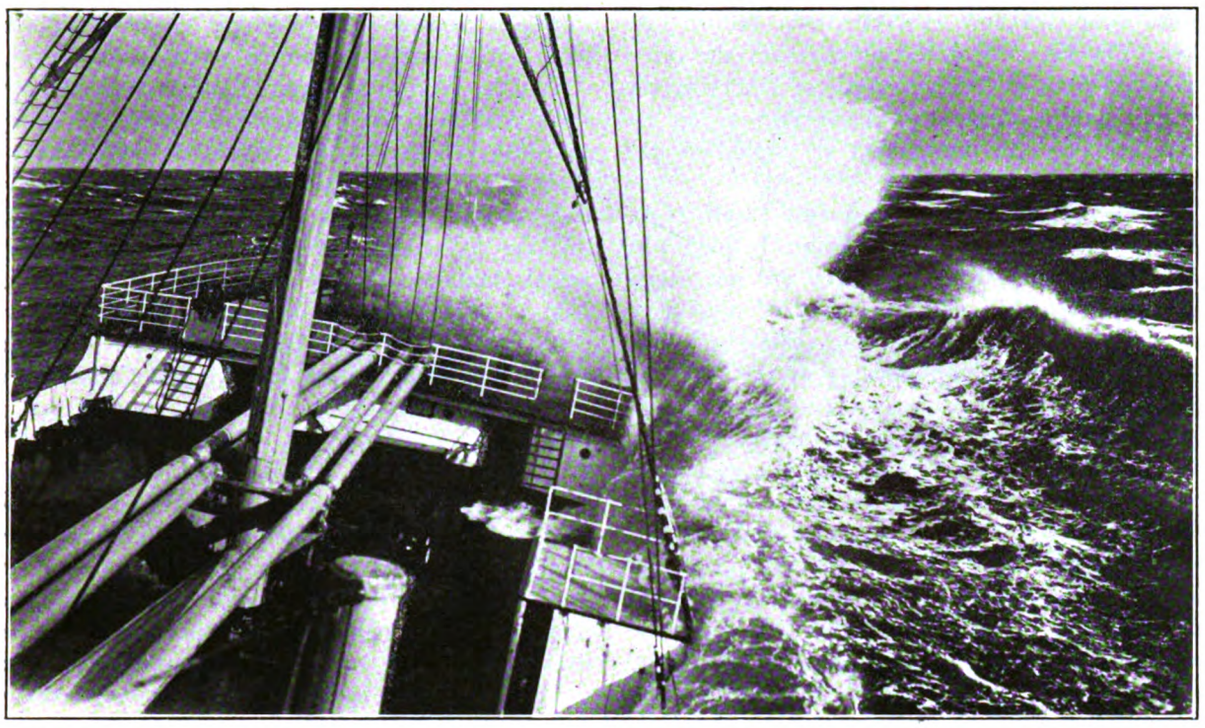
We have on hand the best potential salesmen ability that the world has ever known. Years ago Americans abroad were no credit to their home country, but those days have passed. Our consuls, at one time were a miserable lot; but those days, also, happily have passed. But still we must be careful of our representatives.

We have been strangely prone to assume that we know better what a foreign market needs than the market knows itself. We may be right but we must not take liberties until we have proven our case. We must abate that foolish arrogance.

It is to the interest of every one that our shipping laws should be such as to make shipping and shipowning possible. They are not so at present. The La Follette law is an attempt to equalize wages on all ships in the world. When I was asked by the Congressional Committee if an increase in wages on the ships would not necessitate an increase of rates. I answered in the affirmative of course. Then I was asked who would pay and the only answer of course was the consumer.

As a matter of fact it will cost us 2 or 3 cents a bushel more to carry grain under this law than it did under the old laws. Will the consumer pay it always? No. Sometimes the producer must pay it—he must if he meets competition not similarly burdened, and he does exactly that when he sells his grain for export. When we are forced to charge increased freights the farmer must sell at a less price or not sell at all. And so, also, with the manufacturer. This shipping problem is a great one touching all of us.

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The "Elkab" in a bit of weather off Cape Horn.

What Our Shipping Business Needs

By E. F. DeGRANDPRE

IN the main my ideas are that what is needed is to give shipping business more leeway. Quit hampering it by increased restrictions. The Government properly does not impose on the majority of business interests ashore, such for instance as the automobile industry, and doesn't suspicion their motives, frown on their profits, etc. That is one reason that capital is so much more anxious to enter those fields than the shipping industry.

The Government seems to take it for granted that the manufacturers of automobiles and other vehicles for transporting passengers have enough common sense to construct their conveyances in a safe manner and permits such industries to make such profits as is possible in competition with others in the same field, but in the administration of marine affairs it would seem that the Government believes the public must be protected against the foolishness and avariciousness of the owners and operators. It places itself in the position of assuming that the owner or operator of a steamboat would send a vessel to sea, and that there are masters, chief engineers and other members of the crew who would take vessels to sea that would not be safe for them, or for their passengers to travel on. It continually develops increased necessities for further protection, such as the more recent ones embodying auxiliary lighting systems above the load line, the carrying of tanks of oil to smooth the violence of the waves, etc., etc. These cost the shipping interests as a whole hundreds of thousands of dollars, even though singly they are small contrivances, and reduce the margin of profit, in normal times, to such an extent as to discourage the investment of capital in the development of the business.

Before any man of money can be induced to build ships he must be satisfied that he can obtain reasonable returns on his investment and that there is reason to expect such returns to be stable. If it is within the power of certain Government employees to ruin, or at least jeopardize the stability of his investment by placing regulations in effect that they deem essential and that will cost him a lot of money, he is going to feel inclined, as you or I would, to forego such an investment.

Our policy should be just the opposite. To reiterate, it should be the same as in any other competitive situation. The most important thing in business is to keep track of your competitors. In the shipping line our most important competitor is England, and fast on her heels is Germany and Japan. The latter country is assuredly making rapid strides toward a most important position in the commerce of the world.

Any business man who has competitors who enjoy greater success than himself esteems it a great advantage if he can learn the successful methods of his competitor and he will readily adopt them, at the same time endeavoring to surpass his competitors. It would seem logical for this Government, from a business standpoint, to follow such a practice.

We have made a failure of the shipping business so far as it pertains to expansion. The other countries above named have made successes. Why not, then, adopt the practices that have spelled success for

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the other countries and turn our own failure into success? The keynote of the practices of the other countries has been to foster, instead of hindering the shipowners and operators—to make that as an inviting a field for the investment of capital as the mercantile fields.

If experience has shown that drastic safety regulations are not necessary with foreign vessels, why isn't it a logical conclusion that they are not necessary with our vessels? If the method of measuring foreign vessels is favorable to those vessels so far as the payment of operating expenses at the different ports and canal tolls are concerned, and it certainly is, then why not adopt their system of measurement, or go them one better and place in effect a system of measurement of American vessels that will be more favorable than the foreign steamers, so that our vessels will have an advantage over the foreign vessels in the world ports? The loss of revenue in this way to our Government would be infinitesimal in comparison with the benefits that would accrue to steamship operators in the foreign trade and the advantages that would therefore eventually accrue to the Government by having an increased number of American vessels.

If drastic regulations with respect to testing the boilers, safety appliances, etc., are not necessary so far as Government vessels are concerned, neither are they necessary so far as commercial vessels are concerned. The life of a soldier on a transport must be considered just as precious as the life of a commercial passenger on a privately owned steamer.

It would be worth while for some of our legislators to make a study of the attitude of our neighbor, Canada, toward its shipping, as well as its other industries in general. A request by any of its shipowners upon Parliament is given the greatest consideration, and shipowners' and shipoperators' opinions with respect to pending legislations are welcomed and carry the weight that they deserve. In our good country the advice of shipowners is discredited and ulterior motives attributed to the owners. Canada will see to it that American vessels do not take away from them any trade that it is possible for her own interests to serve. We permit Canadian boats to get away with a great deal of our trade; for instance, the vessels operating between Seattle and Vancouver, which transfer passengers there to other vessels, taking them to Juneau and other ports in Alaska.

Our law provides that foreign vessels cannot carry passengers between two American ports, but a good bit of domestic business gets away from us in this instance through the simple method of carrying it in relays. The U. S. Commissioner of Navigation has repeatedly called this situation to the attention of Congress, asking that they remedy it, by requiring that passengers embarking on foreign vessels in this manner must remain in the foreign port of transfer forty-eight hours or such a matter before re-embarking on a foreign vessel for an American port; but Congress permits Canada to get away with the business that belongs to our own people.

Canada remits to steamship operators that take their coal at Canadian ports a portion of the port charges—in other words, offers an inducement for them to trade with Canadian industries in preference to American industries. Why don't we do the same, offering to reduce the port charges at Seattle for vessels taking coal here in preference to Vancouver Island? To obtain the business in competition, competitive conditions must be met. We admit Canadian coal to this country free of duty, but Canada is wise enough to retain a duty on coal imported into that country of 67 cents a ton. Would it not be well for us to wake up and equalize competitive conditions that are at present decidedly against us in the shipping industry? How else can we hope to interest capital in building vessels? How else can we hope for our foreign trade to become healthy? I daresay that none of our Government officials or representatives in Congress would care to invest their personal funds in the shipping industry in its present unfavorable condition. How, then, can they expect others to do so, or how could they justify the investment of the taxpayers' money in such a manner?

THE ABLE SEAMAN OF THE FUTURE.

THE following examination of the Department of Commerce defining the able seaman as provided for in the Seamen's Act will be of unusual interest:

(a) Boxing the compass.—The applicant will be required to box the compass by points or degrees, according to the experience he has had in the use of either method.

(b) Lights and fog signals.—A knowledge will be required of the running and anchor lights for steam and sailing vessels on the sea, inland waters, or Great Lakes, and a like knowledge of fog signals, according to the waters on which the applicant has served.

(c) Signals for starting, stopping, slowing down, and backing the engines of steam vessels.—This examination will be restricted to the signals in use on the sea, or Great Lakes, according to the waters on which the applicant has served. In view of the widespread use of engine telegraphs, knowledge of engine bell signals, while deemed advantageous, will not be required if in other respects the candidate qualified.

(d) Passing signals for steam vessels.—To be confined to vessels meeting or passing under ordinary conditions.

(e) Knotting, bending, splicing, and hitching.—The applicant will be required to make a few of the principal knots, bends, splices, and hitches in common use by sailormen.

(f) Ability to pull an oar.—The applicant's knowledge of pulling an oar will be determined by actual trial in a boat.

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(g) **Clearing away, lowering, and getting a boat away from the ship.**—The applicant's ability will be determined by actual trial aboard ship.

(h) **Handling boats at sea.**—This examination will include questions relative to the proper handling of a boat in running before a heavy sea; in pulling into a sea; the trip of the boat; and steering with an oar, tiller, or yoke.

(i) **Knowledge of nautical terms.**—The applicant will be required to definitely locate different parts of a ship, and to give the names of the different masts, sails, rigging, davits, etc.

(j) **Steering.**—The applicant will be required to demonstrate his knowledge of handling the wheel of a steamer by obeying orders passed to him as "wheelman."

What Is the Law of the Land

MR. FURUSETH STATES THAT SECRETARY WILSON TOLD HIM THE FOLLOWING IN RELATION TO THE RIGHT OF JAPANESE SEAMEN TO DESERT THEIR SHIPS IN AMERICAN PORTS UNDER THE SEAMEN'S ACT.

MR. ANDREW FURUSETH at a meeting in New York City stated that Mr. Wilson, the Secretary of Labor, had stated to him that Japanese sailors would be permitted to freely desert their ships in American ports. He was asked to repeat this to a stenographer. The following is from the stenographer's notes:

MR. FURUSETH: I said that Japanese seamen leaving or deserting from their vessels, whether they be Japanese or other vessels, after the so-called La Follette Seamen's Bill is in operation, will have the right to do so, and that they will not be arrested and placed back on their vessels under the immigration laws.

PROF. JENKS: Let me ask a question. If Japanese seamen leave their vessels, in the port of San Francisco, will they be allowed to go freely where they please about the city or anywhere in the United States, or will they be confined or shut up in an immigration station?

MR. FURUSETH: They will not be shut up in any immigration station, nor will they be deported, if they are not otherwise objectionable; that is, the fact that they are Japanese will not prevent them from landing.

PROF. JEREMIAH W. JENKS, Director of the New York University School of Commerce, Accounts and Finance, was present at this meeting and very much interested in the subject, and wrote Secretary Wilson regarding Mr. Furuseth's statement. This letter and the reply of the Secretary of Labor certainly should be interesting reading to the great mass of law-abiding citizens of the United States.

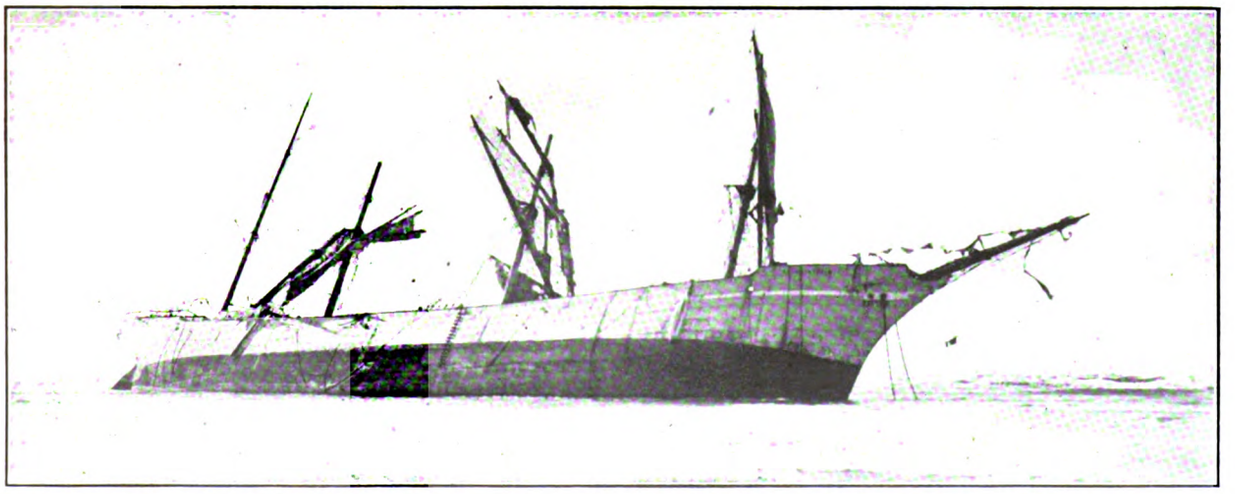
Does Congress make the laws of this country and executive officers carry them out, or are the laws ignored and do departmental rules and regulations take their place as executive laws?

(Copy)

NEW YORK UNIVERSITY
SCHOOL OF COMMERCE, ACCOUNTS AND FINANCE.
Washington Square, New York City,
July 22, 1915.

My Dear Mr. Secretary:

In a conversation with Mr. Furuseth the other day regarding the La Follette Bill he said, "that Japanese seamen leaving or deserting from their vessels, whether they be Japanese or other vessels, after the so-called La Follette Seamen's Bill is in



Wreck of the "Peter Iredale." The occasional loss of a large sailing ship is rapidly depleting the ranks of these fine craft and incidentally doing away with the possibility of ever again having a large number of real sailors.

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operation, will have the right to do so, and that they will not be arrested and placed back on their vessels under the immigration laws."

As you know, I am extremely interested in the whole question of immigration as well as in the question of the development of our merchant marine, on which subject I have been compelled to write somewhat. I asked Mr. Furuseth this question:

"If Japanese seamen leave their vessels, in the port of San Francisco, will they be allowed to go free where they please about the city or anywhere in the United States, or will they be confined or shut up in an immigration station?"

He replied:

"They will not be shut up in any immigration station, nor will they be deported, if they are not otherwise objectionable; that is, the fact that they are Japanese will not prevent them from landing."

I had myself understood that under our agreement with Japan and our immigration laws, Japanese laborers whether sailors or others would not be allowed to land and go where they pleased unless they had a proper certificate from their Government, and that the Government would not issue such certificates to laborers, sailors or others.

If Mr. Furuseth's statement is correct, it seems to me that it would very materially modify my judgment of the probable effect of the so-called La Follette bill. I am very anxious to be right on this subject, as I have more or less writing to do in that connection and I shall be very glad if I can have an opinion of the Department of Labor on that question. Of course, I presume that official rulings are made only when specific cases arise, but you may have instructions to Immigration Officials or laws and rules of the department which cover the case. I should be very glad if I could get further information on the subject.

Very respectfully yours,

(Signed) J. W. JENKS.

Honorable William B. Wilson,
Secretary of Labor,
Washington, D. C.

(Copy)

DEPARTMENT OF LABOR
OFFICE OF THE SECRETARY,
WASHINGTON.

53775/149 July 26, 1915.

My Dear Professor Jenks:

I beg to acknowledge the receipt of your letter of the 22nd instant, in which you request that you be advised what effect the La Follette Seamen's bill, in operation, will have on Japanese seamen who may leave or desert their vessels in ports of the United States, Mr. Furuseth having advised you that such seamen will neither be deported nor detained in an immigration station. Your hypothetical case cites seamen of the Japanese race apparently for the reason that Japanese of the laboring class are in no respect admissible to the United States unless they have complied with the existing passport agreement with Japan.

Of course, the bill, as enacted into legislation, will not have the practical effect of operating to override any of the provisions of the immigration law—it is neither an amendment nor an addition to the Immigration Act. All alien seamen (this applies to Japanese irrespective of the passport requirement) are entitled to land at ports of call in this country in pursuit of their calling, and a presumption of unlawful residence in the United States is not created against them until it is apparent that there was an intent on their part to abandon their calling evidenced, for instance, by desertion from the vessel, presence here after the vessel had sailed, departure for interior points, etc.

The existing regulation requires that seamen whose employment terminates at a port of the United States shall be treated as seamen (accorded the privileges which are extended to that class of people by reason of the peculiar status which they occupy), "if it appears that they intend to reship on a vessel bound to a foreign port, or to depart from the country within a reasonable time." The regulation further states that seamen who are insane, diseased, etc., are persons whose employment on board vessels is unnecessary to commerce and navigation, and that employees of vessels so afflicted are not entitled to the exception which is made in their favor because not within the reason therefor. Furthermore, Section 9 of the Immigration Act would compel the levying of a fine against the master of any vessel which brought such insane or diseased seamen to the ports of this country. If seamen are found in the United States otherwise engaged, even though they landed as seamen, or if they are found to be public charges, they are treated exactly as other aliens, and are considered as liable to deportation in like manner and for like causes. The existing requirement that the immigration officers shall inspect those claiming to be seamen to a sufficient (but no further) extent to determine whether or not they are and intend to remain such, and to prevent violations of law incident to the bringing of diseased aliens to the country, will in no sense be affected by the new seamen legislation.

To answer more specifically your inquiry, you are advised that Mr. Furuseth was correct in his statement that the fact that a Japanese seaman will not be prevented from landing in the United States (in pursuit of his calling) because of the fact that he possesses no passport permitting him to come to this country. The situation will be otherwise, of course, in the cases of such seamen who evidence an intention of taking advantage of the exception which is

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made in favor of seamen generally, and of thereby gaining a permanent foothold in the United States.

Very truly yours,

(Signed) J. B. DENSMORE,
Acting Secretary.

Professor Jeremiah W. Jenks,
Director, New York University,
Washington Square, New York, N. Y.

Extract from article published in Watsonville, Cal., Register, under date line—Sacramento, Cal., October 7:

(Quotation from speech of Andrew Furuseth.)

"The result will be, under the Seamen's act, that when a foreign ship comes into an American port, the seamen on her will quit unless they are granted the wage scale in effect in that port. If they don't get it, they will quit and ultimately the master will be forced to pay the scale to another crew. Before, if the men quit, they would be arrested as deserters.

"Now, for example, if a Japanese ship comes into Seattle and her crew demands the Seattle scale, or nearly as much, the master will either have to pay the increased wages or let his ship lie idle until he can have a crew sent from Japan, for the ship cannot take on an English or American crew, for the reason that the Seamen's Act requires that 75 per cent. of the crew understand the language of the officers, and the Japanese ships have Japanese officers, and therefore must have a Japanese crew. So we are forcing Japan to meet our wage scale, part way at least. At present she has everything she wants."

It would appear from Secretary Wilson's letter that the Japanese sailor deserting his ship is in a rather peculiar, we might even say, negative position. The Japanese sailor sets up a presumption of unlawful residence by deserting his ship, according to the second paragraph of Secretary Wilson's letter, but in the next paragraph he is lawfully a resident of the United States when his employment terminates at an American port and it appears that he intends to reship within a reasonable time. Now, there is no such thing as desertion in the eyes of the men who might reasonably be expected to induce the Japanese sailor to leave his vessel, but nevertheless the Seamen's Act recognizes "desertion" and even fixes a penalty for it. This was perhaps an oversight, but the fact remains that any Japanese sailor leaving his ship with the intention of not returning, whether he be thinking of returning to Japan on another steamer or of taking up residence in the United States, is a deserter and has set up the presumption of unlawful residence. The penalties formerly attached to desertion may be modified by the Seamen's Act but there is not one word in that promiscuous document that weakens or even attacks the "fact" of desertion.

It would appear that with the kindly offices of the Secretary of Labor that Mr. Furuseth would be able to put over his Japanese desertion program, but there is another angle to the question which he has always avoided and that is the attitude of the Japanese Government. Our immigration laws are at the present time a source of much irritation to the Japanese Government, but what will they prove in the future if we use them as a club to interfere with Japanese commerce? Mr. Furuseth's dream that not one nation will try to retaliate in any way on account of the flagrant abuses of the Seamen's Act is too wild a figment of the imagination to be seriously discussed. Tampering with Japanese crews at Pacific Coast ports if carried to the extent of crew desertions will give rise to an international complication that will make the Japanese School Children and the Immigration Law squabbles look like mere child play. Perhaps if the country is brought to the verge of a war over this matter, Congress will finally realize that the wholesale breaking of contracts is not regarded so favorably abroad as it is at home. Mr. Furuseth has staked his reputation as a prophet time without number on his assertion that the Japanese crews will desert and demand higher wages for their return voyage. They will not desert unless they are induced to do so by some outside agency and the Sailors' Union would appear to be the only organization having any interest in their desertion. One thing is certain, if Japanese crews are induced to desert at American ports and the Seamen's Act has to shoulder the blame for the trouble that follows, that much discussed measure will be speedily erased from the statute books. The United States, having no foreign trade merchant marine to speak of, has set out to make laws for the entire universe covering the operation of ships and in so doing has thrown herself open to a shameful comparison with the ass under the lion's skin who carried all before him until he happened to bray.



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The Passing of the Mail Company

THE disappearance of the Mail fleet from the Pacific has been looked upon with much sadness by those who are interested in ocean commerce at San Francisco. Exporters and importers do not hesitate to voice their disapproval of the Seamen's Act which made the abandonment of the transpacific carrying trade by American ships imperative, but even in San Francisco the feeling is not so poignant as in the Hawaiian Islands, the Philippines and the American colonies in the cities of the Orient. The American flag floating from the stern of a Pacific Mail steamer was the one connecting link with home and country for many an American and the passing of the Mail Company to these is more than a business setback —it is the pathetic destruction of the last visible demonstration that somewhere far away across the wide Pacific lies the country of which they are always dreaming,—home.

It was only natural that the last homeward journeys of the steamers of the Pacific Mail were made occasions of heartfelt demonstrations at Hongkong, Kobe, Manila and Honolulu and it is at these ports that Andrew Furuseth and Robert M. La Follette will never be forgotten,—or forgiven.

On her last homeward trip the "Manchuria" was tendered an impressive farewell at Honolulu and among the written expressions of regret received by her captain was the following letter:

September 29, 1916.

Captain Andrew Dixon, Commander, Pacific Mail Steamship "Manchuria" and the Officers Thereof, at Honololulu, Hawaiian Islands.

Dear Captain Dixon:

The Hawaii Promotion Committee, the pioneer tourist bureau of the middle of the Pacific Ocean, which has diligently endeavored to call the attention of the traveling world to the Paradise of the Pacific, and, in this wise, to aid in the building up of the American merchant marine, particularly in the Pacific, takes this occasion to offer its Aloha (farewell), but with regret, for with the departure of the Pacific Mail steamship "Manchuria" for San Francisco this morning, the last vessel of an American steamship line, which has carried the American flag back and forth across the Pacific for more than four decades, sails the last hope for the preservation of the American flag on the Pacific Ocean west of the Hawaiian Islands, the baby territory of the United States. Much of the prosperity of the Hawaiian Islands has been due to the regular service which the Pacific Mail Steamship Company maintained between California and Honolulu, and between the Far East and Honolulu, and it is with the deepest regret that the Hawaii Promotion Committee regards the departure, for the last time of the last splendid vessel of the grand old Pacific Mail Steamship Company, leaves these shores of Hawaii nei, realizing that national and adverse legislation, has been responsible for this calamity.

With found aloha, therefore, the Hawaii Promoton Committee, on behalf of the people of Hawaii, says goodby. Very truly yours,

HAWAII PROMOTION COMMITTEE.
(Signed) A. P. Taylor,
Secretary and Director.

In the Japanese ports also the residents of the American quarters are already missing the regular visits of large steamers flying the Stars and Stripes and the following verses from H. F. Sanborn, manager of the Pleasanton Hotel, Kobe, Japan, are illustrative of the regard in which these messengers from home were held:

We are going far away, far away to leave you now,
We are folding up the dear old flag we carried
For over fifty years with our earnings in arrears
Because the Seamen's Bill and Uncle Sam got married.
For giving shipping such a slam, we must pity Uncle Sam
In his foreign trade he soon will have to tarry.
He lost his common sense, so will sit upon the fence
Whilst he gives his goods to foreign ships to carry.

We have lived here many years, with our troubles and our fears
Always watching for our ships from homeland coming
And the shout of "ship ahoy" gave the most exquisite joy
To the ones whom foreign trade had sent a-roaming.
But now our dear old boats, through a lot of stupid goats
Have been driven from their trade upon the ocean.
So now we'll pack our kit, very soon to make exit
Never more to see our dear old ships in motion.

We are going home to stay, never more to come away,
We are tired and so wearied of our working
To keep the dear old rag, oh, the good old U. S. flag
From its enemies who in Congress are a-lurking.
So now we say goodby to the flag that once on high
Proudly floated o'er our ships in all the climes
From our clipper ships of yore, to our present great "big four"
Of the finest, swiftest ships of modern times.

So farewell to the Mail, to the great Pacific Mail
You have proudly kept our flag upon the ocean
In sunshine and in rain, you have braved the stormy main
And you always gave us service and devotion

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The sailing or arrival of the "Mail" steamers will no longer be a San Francisco institution.

With your decks so clean and bright and your cabins shining bright
We had always loved to travel on your steamers
But now we'll say adieu to your officers and crew
Whilst you're hauling down your banners and your streamers.

PACIFIC MAIL'S PASSING LEAVES TRAIN OF HEARTACHES.

"The passing of the Pacific Mail Steamship Company from the commercial life of California has left in its wake a train of heartaches in places where questions of national legislation received far too little attention in the past, and who now, alas, find it is too late to repair the evil which has been done to all of them by this one act—the La Follette Seamen's Bill," says the California Industries Magazine for August.

"Scores of jobbers,
"Scores of supply houses,
"Scores of manufacturers,
"Scores of business houses,
"Thousands of employees,

"All of the above have been participating in the past in the annual $5,000,000 spending account of the Pacific Mail Steamship Company in California alone. When a manufacturer loses his cracker account of some $30,000 a year, or paint business of an equal value, he is feeling the direct effects of this bit of spectacular La Follette legislation.

"The whole thing will serve one purpose. It will teach the people to take more seriously a corporation's side of a public question. This incident has shaken business out of its apathy; people are sitting up and taking notice. They realize that there is such a thing as killing the goose that laid the golden eggs. Remember that big business is not bad merely because it is big. Also that a statement is not to be discredited merely because it defends a corporation."

SAFETY AT SEA TORPEDOED BY CONGRESS.

The Seamen's Bill is designated as an Act to promote the welfare of American seamen and to promote safety of life at sea. Undoubtedly the Act secured its passage through this designation. Appearing, as its promotors did, before a Congress composed of men, many of whom were naturally ignorant of the conditions prevailing on board vessels at sea, the plea of safety for passengers combined with liberation from the so-called "serfdom" for seamen could not fail but make a strong impression upon our legislators, and the present remarkable and contradictory Seamen's Act is the result.

Safety of both property and life at sea, despite the unbridled statements of agitators, is not a new subject and has received the careful attention of naval architects, shipbuilders, owners and marine insurance bodies for many years. The essential principles involved in obtaining the greatest security for those who go down to the sea in ships are: First, to approach as near as possible the absolute safety of the vessel itself, and this has meant more, higher and stronger bulkhead subdivisions, double bottoms, trimming tanks,

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powerful fire extinguishing apparatus, special escapes for members of the crew who perform their daily duties in inclosed spaces, rigorous inspection and building rules, etc. Second, providing the highest standard of equipment for leaving the ship in case of disaster, and, finally, the thorough training of the crew in the handling of this equipment.

This equipment for leaving a ship in times of distress has attained a high degree of development and, on great passenger vessels, is composed of a very large unmber of units. Considering the number of life-boats on the modern passenger steamer and the long expanse of deck space which they occupy, the natural inference is that both the law of the land and the custom of the sea would converge towards the idea that as high a percentage of the entire crew as possible should be conversant, not only with the swinging out and lowering of life-boats, but also with the handling of these craft when clear of the abandoned ship. This must appeal to everyone as a common sense conclusion to the life-boat problem, and yet the Congress of these United States has, unwittingly perhaps, taken an entirely opposite view.

A Honolulu Viewpoint

A RECENT issue of the Portland "Oregonian" contained an authorized interview with Mr. Wallace R. Farrington, editor of the Star-Bulletin of Honolulu and for twenty-three years a close student of Island and Oriental affairs. Mr. Farrington's statement is, in part, as follows:

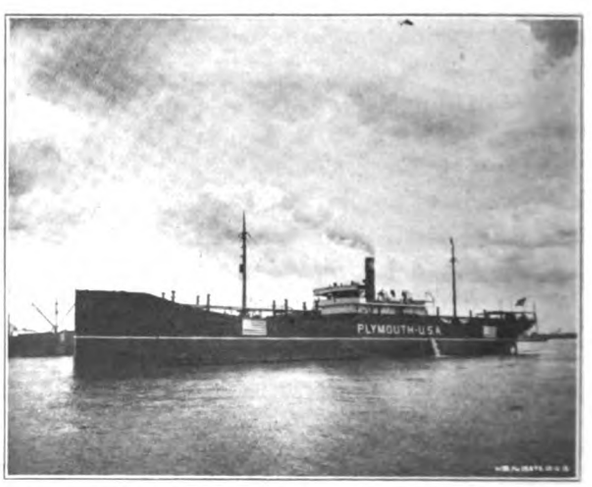
"Shortly after I left Honolulu a movement was started in the Honolulu Chamber of Commerce to memorialize Congress for the repeal of the coastwise shipping law insofar as it relates to Hawaii.

"It can be readily understood why such a movement would secure an enthusiastic following if the citizens of Hawaii were prompted entirely by mercenary motives. The withdrawal of the Pacific Mail boats means that we lose five of the best American liners and four steamers a month calling at Honolulu. Under the coastwise shipping law we cannot travel between Honolulu and the mainland ports on ships flying foreign flags except by paying $200 fine into the United States Treasury. The natural thing, therefore, for the people to do when five American ships are withdrawn would be to appeal for the suspension of this law, unless there were other important factors to be taken into consideration. The important factor is that the suspension of the coastwise law would, in the estimation of a great many well-informed people, result in the Japanese steamers taking practically all the business between Honolulu and the mainland of the United States.

"Consequently, it is to the credit of the Honolulu Chamber of Commerce, made up of the large and small business factors, that the members, at a largely attended meeting, voted down the proposal to request the suspension of the coastwise laws.

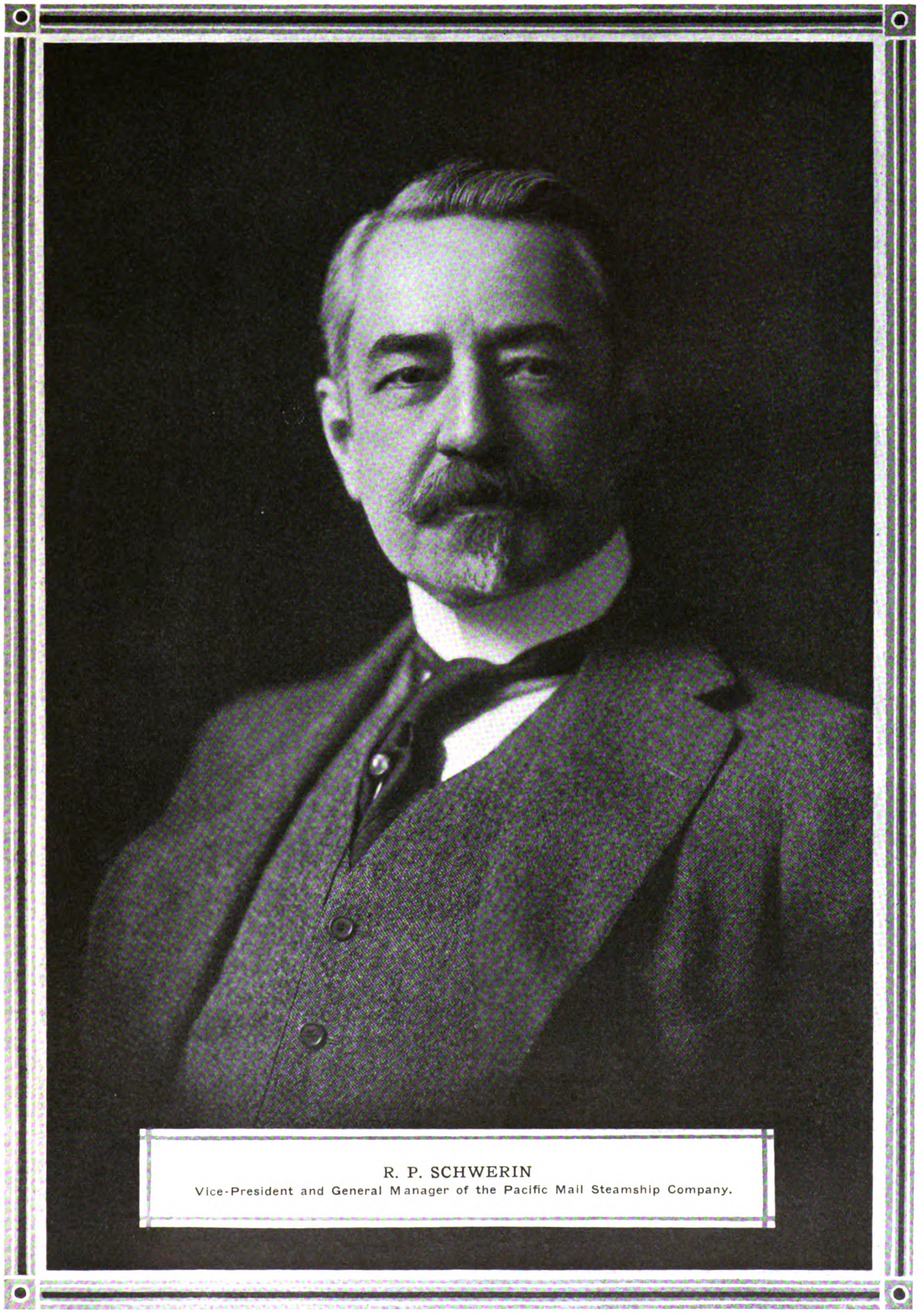
"The merchant ships of the United States ought to be the leading carriers of trade on the Pacific Ocean. We must have the ships if we expect to keep control of our connections with the naval and military, to say nothing of the commercial outposts of our country. I do not pretend to be an expert on the subject of what form of legislation will best develop our merchant marine. But I have had some experience as an observer of the course of events in the Pacific. We cannot hold our prestige by sitting tight and letting Nature take its course. Certainly, the country would be in a most ridiculous and dangerous position if the traffic between Honolulu and the Pacific Coast ports of Portland, San Francisco and Seattle should pass into the hands of foreign shippers operating vessels under foreign flags. That is what the law would mean, and that is apparently what the seamen's law already has done to the traffic between the Philippines and the mainland of the United States.

"I am not in a position to say that the seamen's law is the source of all our difficulties. I can only observe one of its first results, and it is obvious that something must be done to counteract its ill effects or supplement its good features. We need a clear-cut policy for the upbuilding of the American merchant marine if we are to continue to do business and hold our own beyond the three-mile limit of the Pacific and the Atlantic coasts."



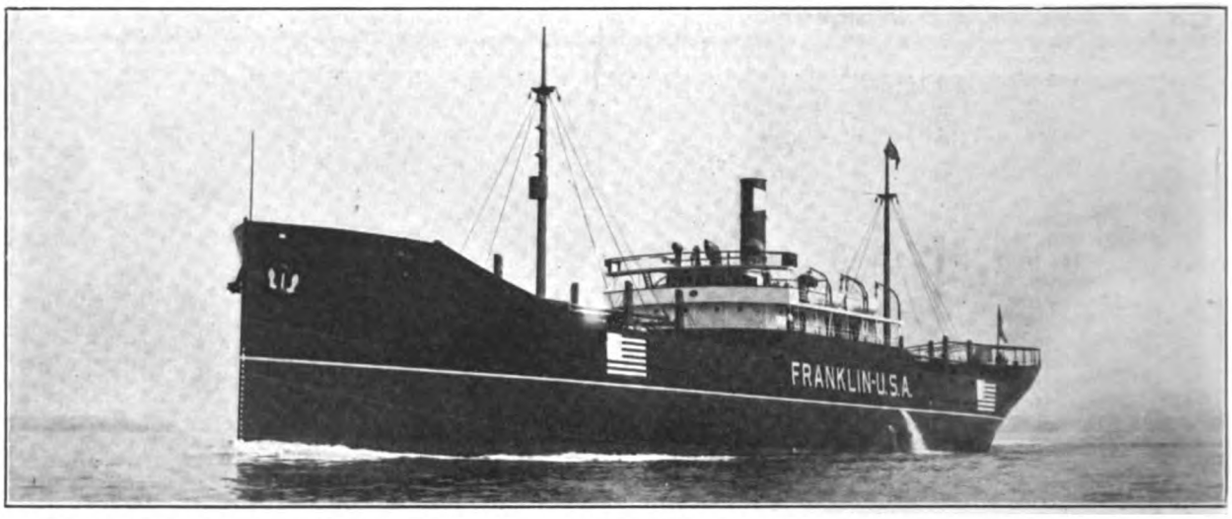
The "Plymouth," one of the latest vessels completed at the New York Shipbuilding Company.

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R. P. SCHWERIN
Vice-President and General Manager of the Pacific Mail Steamship Company.

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The "Franklin" on trial. This vessel is one of seven colliers building at the New York Shipbuilding Company's plant for Mediterranean service.

East Coast Yards Still Taking Contracts

During the past few weeks the following contracts have been closed in the East Coast yards: New York Shipbuilding Company is to build four steel car floats for the New York Central Railroad; the William Cramp & Sons Shipbuilding Company has booked two 9000-ton passenger and freight steamers for the Ward Line, and this concern has also let contracts totaling some $700,000 for various improvements and enlarging the shipbuilding ways at the Philadelphia plant; the Staten Island Shipbuilding Company received an order for a steel steam lighter for the Pennsylvania Railroad and a similar craft for the New York Central and Hudson River Railroad; Harlan & Hollingsworth have booked a 250-foot steamer for the Baltimore and Carolina Steamship Company; the Fore River Shipbuilding Corporation secured two 415 by 56 by 32-foot tankers for the Texas Oil Company; W. & A. Fletcher Company of Hoboken have booked a steel tug for the New York Central and Hudson River Railroad; the Pennsylvania Railroad has contracted with Arthur McMullin of New York for the erection of a $1,000,000 steel and concrete coal pier at Baltimore; the Staten Island Shipbuilding Company is to install two 160-horse-power Bolinder engines in a sea-going plaster barge and the Bolinders Company are installing two 160-horse-power engines in the bark Camela; it is understood that the Robins Dry Docks and Repair Company are to install the White Oil Burning System in the "Kroonland" and "Finland."

BALTIMORE PLANT BUSY.

The Baltimore Dry Docks and Shipbuilding Company is at the present time overwhelmed with work, both new contracts and repair, alteration and overhaul jobs. Under the management of Holden A. Evans and his associates, this old established yard has taken on a new lease of life and strenuous efforts are being made to enlarge the shop facilities of the plant in order that work which in some cases has had to be turned down can be accepted. Some idea of the present activity in shipbuilding may be gleaned from the fact that the new management of this yard has on hand already the following contracts: Four oil tankers for Christoffer Hannevig of Norway, these are to be fitted with large Bolinder engines; the big Government dredge "San Pablo," and in addition to these the following steamers are at the wharves or in the docks of the company undergoing repairs: "Elizabeth Weems," "Skogstad," "Francis Hanify," "D. N. Luckenbach," "Tabor," "Hulda Maersh," "Calliope," "Tafna," "Urd," "Petritsis," "Lord Roberts," "Charles F. Mayer," "Piedmont," "City of Norfolk," and "City of Baltimore."

The pictures herewith illustrate two of the public spaces on the Anchor liner "Tuscania," which vessel being designed by L. C. Peskett, Naval Architect for the Cunard Line, may be said to represent the latest endeavors of the Cunard Line towards the comfort and safety of passengers. The "Tuscania" has been in service about one year and is on the New York-Glasgow route. One of the interesting features about this handsome vessel is the fact that several distinctly American products have found their way into her construction and among these may be mentioned Nevasplit paneling, made by the Keyes Products Company of New York. This material was used in the writing room, the tapestry lounging room, the dining room and in some of the second-class cabins.

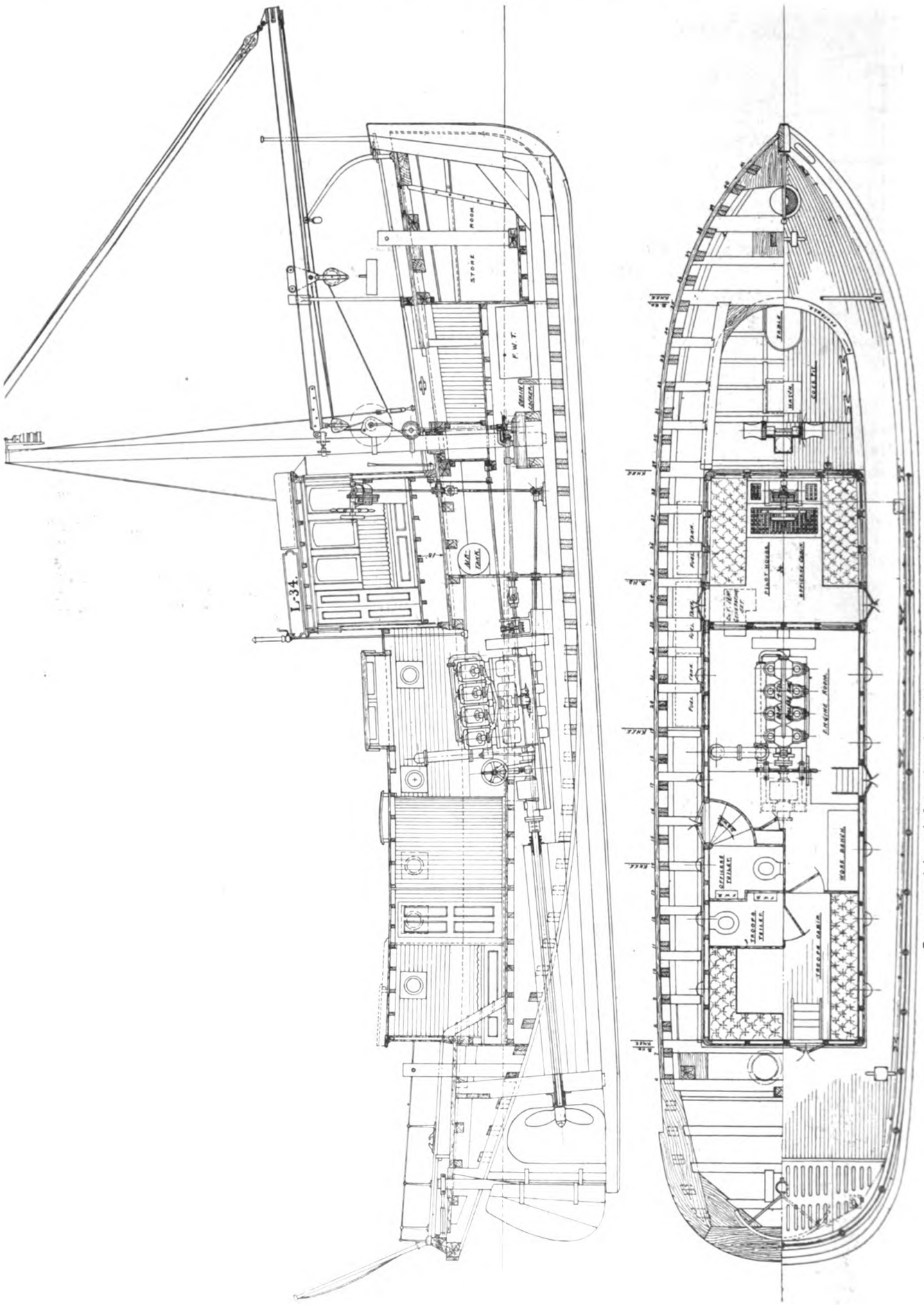
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Veranda (upper) and grill room (lower) on the Anchor Line steamer "Tuscania" now operating on the New York-Glasgow run.

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Government launch for submarine cable work, a product of one of the local boat yards.

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Submarine Cable Service Launch

THE accompanying design by W. S. Brusstar, Jr., of Oakland, illustrates Distribution Box Launch "L-34," built to the order of the Depot Quartermaster of the U. S. Army. The craft is of the following dimensions: Length over all 64′ 0″, length on load water line 63′ 10″, beam molded 14′ 0″, extreme beam 14′ 6″, beam over guards 15′ 4″, depth molded 6′ 6″, load draft 6′ 6″. The stem, stern post and rudder post are of oak, while the keel, apron, rim and shaft logs, keelsons, horn timbers and engine girders are of selected Oregon pine. The outside planking is also of Oregon pine, while the frames are of Port Orford cedar spaced 18″ centers.

The principal uses for which this launch is intended is making up the joints on various submarine cables. These joints are made up in large metallic junction boxes weighing as much as 3000 pounds and it is necessary for these boxes to be handled overboard in choppy weather and lowered to as great a depth as 200 feet.

The hull is divided into four compartments by three bulkheads situated on frames, 7, 24 and 35, these bulkheads are built up of double thicknesses of ⅞″ T. & G. laid diagonal. The extreme forward section of the launch is taken up for storeroom purposes, and aft of this storeroom is the cockpit with table for handling the junction boxes, the forward end of the coaming being portable. At the after side of the cockpit is a short mast fitted with a steel boom on whiih a traveler is operated for running the junction boxes outboard before lowering them. The hoisting drums are direct connected to the main engine. The space underneath the cockpit floor is utilized for a fresh water tank and a chain locker. The pilot house is immediately aft of the mast and is raised eighteen inches above the deck. The pilot house is made quite roomy, being intended as an officers' cabin as well as a wheelhouse.

The after cabin is depressed and is entered from a companion way at the after end of the house. This house serves as a shelter and toilet for the crew while there is also an officers' toilet at its forward end reached by a separate companionway from the port side. The launch is very heavily and substantially built, being intended for a service that is full of hard usage.

The power plant in the "L-34" is a 4-cylinder 80-horsepower "Corliss" Marine Engine. The engine is of the 4-cycle vertical marine type, 9″ bore by 10½″ stroke, turning a 45″ diameter, 37″ pitch, three-bladed bronze propeller at 340 revolutions per minute.

The reverse gear is of the planetary type, equipped with a multiple disc clutch. The reverse gear brake is operated by a hand wheel for easy handling of the engine. The propeller thrust is taken care of by six thrust collars turned from the solid center gear extension, which are of large diameter. The thrust bearing is securely bolted to the engine base, and water-jacketed.

The engine is of the "closed-base" type, having a cast iron frame with cast iron doors secured to the frame by cap screws. No gas or odor is emitted, and this arrangement also entirely does away with the grave danger of semi or total asphyxiation, fresh air being admitted at the after end of the frame and drawn out at the forward end, and passed through the pipes to the vaporizer, thus preventing any accumulation of gases in the base.

The base is provided with five main bearings lined with plastic bronze shells, which can be easily removed and replaced. These bearings are of the ring-oiling type, provided with large oil-tight cellars under each bearing.

As in all "Corliss" engines, the cylinders are cast separately, also the heads, which are held in place by bolts, thereby permitting of an easy inspection. The cylinders are of the T-Head type having the inlet valves on one side and exhaust valves on the other side, which allows larger valves (an added advantage to any gas engine). All valves are mechanically operated, easily accessible, and can be removed for inspection or regrinding by merely removing the valve covers directly above them.

The circulating water is passed from outside by-passes, which are equipped with regulating plugs from cylinder to the head, assuring thereby perfectly controlled water circulation. The joints between the heads and cylinders are fitted with copper gaskets; in fact, all joints are fitted with copper gaskets wherever there is explosive pressure, preventing the blowing-out of the gaskets just after engine has been re-assembled.

The engine is equipped with gooseneck, for the exhaust, which prevents the sea water from getting back into the cylinders in high seas, in case this boat might be commandeered along the coast under her own power.

Ignition system consists of a Bosch low tension gear driven magneto with twelve Type "Q" cells battery as an auxiliary. The igniters, which are of the make and break type, are located in the cylinder heads so that firing point is directly in line with the piston. The time of ignition can be advanced or retarded at will and thereby the speed of the engine changed while the engine is running.

The engine is fitted with a substantial, sensitive governor of the throttling type, driven by gears,

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The "L-34" is a well-found craft with powerful lines.

and is fitted with speed attachment whereby the speed of the engine may be changed as desired, at any time, while the engine is in action. By bell cranks and rods, this governor control is brought up to the pilot house so that the pilot can adjust the speed of the engine himself, without giving signals to the engineer.

The engine is equipped with a large plunger bilge pump, which can be used as such and also as auxiliary engine pump, the water circulation being accomplished in general by the centrifugal pump which is of large capacity.

The engine is equipped with a thoroughly reliable air starting device, being operated by the cam shaft and connected with flexible tubing to the four cylinders, as each cylinder is equipped with a special air starting valve allowing the engine to start, practically speaking, at all times, by just simply opening the air starter valve and closing same after engine is running.

The steering gear is of the "Corliss" auto type with the engine reverse and steering gear led to one stand on the pilot house. The engine reverse wheel in pilot house is connected by shaft and bevel gears to the engine which transmits the motion to the reverse gear (as shown in the accompanying drawing) and by having the right ratio of bevel gears, is very easily handled in the pilot house.

The main fuel tanks, which are fitted in compartments on each side of the engine room—three tanks on each side—are solidly secured in the lead lined compartments, with drains. They have a capacity of 400 gallons, and are connected by copper piping and galvanized inlet piping, having cocks for each tank in boat, in order to fill any one of the tanks or take fuel out of any one of them, as desired.

The boat carries an electric light plant, which consists of a 1½ horsepower Carlyle & Finch generating set, direct connected from flexible coupling to a four-pole generator. The generator is wound for 42 volts and has an output of 15 amperes, running at 600 revolutions per minute. There is also a 24 cell B-2 Edison storage battery on board, having a rated capacity of 40 amperes. This system takes care of all the boat lights as well as the lighting of the cabins and pilot house.

A single drum hoisting winch is securely mounted on the mast for operating the traveler on boom. The gypsy heads on winch, one for handling the anchor, and the other for handling the distribution box, are driven by the main engine, by means of V friction clutch connected by counter-shaft and bevel gears (as shown in the accompanying drawing). The V friction clutch is operated by a hand lever in front of pilot house on deck. All the material necessary has been designed and built to handle a weight of 5500 lbs.

On the deck of the engine room is mounted a hand bilge and fire pump, 5″ bore by 5″ stroke, manufactured by the Gould Manufacturing Company.

At the four-hour trial run taken August 10, 1915, the boat made a speed of 8.625 knots, at a propeller slippage of 16.99%, the engine turning the propeller 341.7 revolutions per minute.

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A Proposed Auxiliary Powered Sailing Vessel

By RENWICK Z. DICKIE

SEVERAL sailing vessels have been converted into auxiliary powered ships within the last year, and from a commercial standpoint it has been found by their owners that their profits have increased about 50 per cent. over what they could make formerly. In a great measure their increased efficiency has been due to the vessels being able to operate on an almost positive schedule, as the voyages could be based on a fixed speed under ordinary weather conditions. When the vessel could make a speed of, say, eight knots under sail alone, it has been found advisable to shut down the engine and use the sails only, as the increase in speed, due to power under these conditions, is very slight.

A comparison between a sailing ship with an auxiliary engine and a freight steamer will give an absolute preference to the sailing ship. The average speed in both cases has proven to be about the same for one journey. The loading capacity is in favor of the sailing ship, the weight and the space of the oil engine equipment being considerably less. Initial cost, running costs and depreciation are less, and when idle there are no costs for "raising steam" or "stand by" losses. There are no constant repairs to tanks, boilers, floor plates, etc.; no firemen's wages and no coal bunkers, the fuel being carried in space which is useless for any other purpose. Apart from this the sailing ship possesses a greater radius of action.

In designing a vessel of this particular type of service, several problems arise, and to make a vessel fit a great many different conditions is a problem for considerable thought.

The sketch shown herewith illustrates a type of vessel which could at the present time be used in the lumber trade on the Pacific Coast, operating either to the West Coast of South American or to Australian ports. She would carry about 1,500,000 feet of lumber or about 1,800 tons of coal. She is 235 ft. long x 42 ft. beam x 19 ft. depth of hold, and would draw 20 ft. loaded. She would be barkentine rigged—i. e., square rigged on the foremast, this being found very advantageous on the long trips to Australia, where the vessel is a good deal of the time running before the wind.

Some ship captains recommend that such a vessel should carry only one or two yards on the foremast, as more yards are harder to handle and require a larger crew, and every vessel should be rigged to suit her own master.

In order that the vessel could get steamer dispatch at her ports of loading, it will be necessary to equip her with winches capable of discharging about 250,000 ft. of lumber per day. This plant would consist of three double sets of steam winches and a dry back donkey boiler located on the main deck, fitted to burn oil. This boiler will also furnish steam to the anchor windlass.

The main engine is of the 320 H. P. 4-cylinder Bolinder type and would drive the vessel in moderate weather at a speed of 7½ knots loaded. The vessel would be equipped with a two-bladed propeller which would be clamped in a vertical position while the vessel is under sail only.

The engine and fuel tanks would occupy about 5 per cent. of the entire cargo space of the vessel, the tanks being fitted well up in the quarters aft in the space which ordinarily could not be used to carry cargo advantageously.

An approximate estimate has been made on the cost of such vessel and the figures are as follows:

Hull, sails, joiner-work and deck equipment complete	$ 90,000.00
Donkey boiler, winches, anchor windlass, fuel and water tanks installed	9,000.00
Cost of main engine installed	20,000.00
Auxiliary plant, fire pumps, electric lights, etc., installed complete	4,500.00
Total cost	$123,500.00

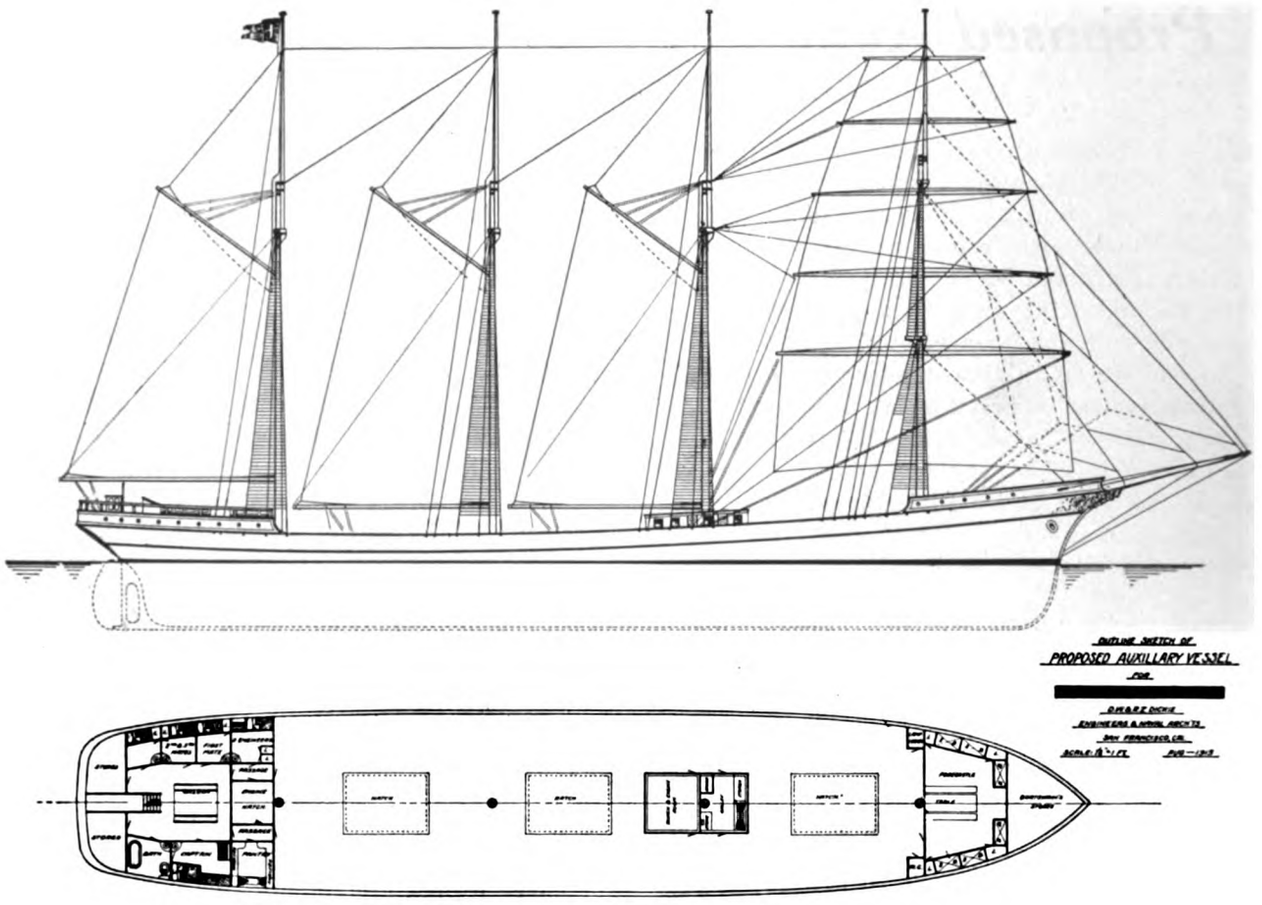
The total fuel consumption would be about 1½ tons per day at normal load, and this oil is worth about 90c a barrel in San Francisco and will go about 7 barrels to the ton.

The operating expenses of this vessel, as near as can be estimated from other schooners of this size (under sail only) would be $70.00 per day, and the engine-room expense, including engineers, fuel, lubricating oil, etc., would be $30.00 per day, when operating engine at full load.

At the present writing this vessel could be chartered for approximately one year, at $200.00 per day (Government form), which leaves all expense of loading, discharging and port charges to the charter party, and as the total expenses for a day's run are $90.00 average, this leaves the sum of $110.00 for the owner, which at the end of a year, with favorable luck, would show a profit of 30 per cent.

If the present high charter rates drop when normal conditions are resumed, the owner has a vessel which can adapt itself to many trades, as it is entirely independent of tugboats and could go into harbors where a larger steamer whose time is more valuable, could not afford to stop, and she is said by many to be an ideal vessel for service on the West Coast.

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The following figures are illustrative of just what may be expected in a financial way from such a craft as is outlined above. The earnings are figured on a basis of one-half the present available charter rates and show clearly the attractiveness of this type of auxiliary sailing vessel as a business proposition at the present time.

Cost ready for sea.....$125,000.00

Hull insurance 7% per annum		$ 8,750.00
Depreciation 5%.....		6,250.00
Crew Wages:		
Captain	$125.00	
Mate	75.00	
2nd Mate.....	60.00	
8 Sailors.....	280.00	
1 Cook.....	60.00	
1 Boy.....	25.00	
1 Engineer.....	125.00	
1 Donkey Man....	60.00	
Per Month.....$810.00		
Per Annum.....		9,720.00
Provisions 15 at 75c per day, 365 days.....		4,150.00
Engine-room Expenses 200 days @ $20.....		4,000.00
Incidentals		2,000.00
Running expenses per annum		$34,870.00
@ 365 days—say $96 per day.....		$34,870.00

Income and Expenditures.

3 trips to Australia (4% @ ½ rates) @ 42/6 less 5% @ $4.80 ex. (less extra ince on deadload) say $9.30 net—per trip	$13,950.00—	$41,850.00
3 trips Australia to Honolulu, 1800 tons @ 18/— per ton less 5% @ $4.00 net—per trip	$7,200.00—	21,600.00
		$63,450.00

Expenses—3 Trips.

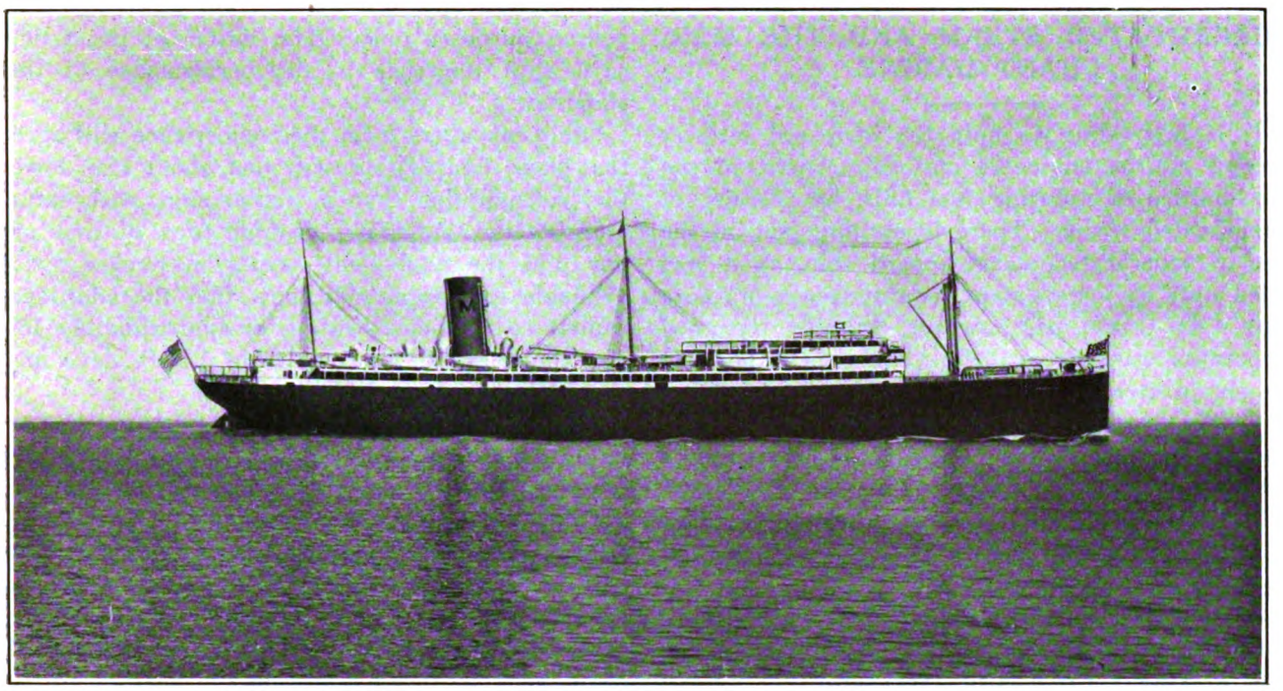
Round trip 115 days @ $96 per day.....	$11,040.00	
Loading lumber....	$1,000.00	
Discharging lumber	1,000.00	
Trimming coal.....	625.00	
Discharging coal...	700.00	
Port charges.....	700.00	
Incidentals	1,000.00	
Per trip.....$5,025.00		5,025.00
Expenses per trip.....	$16,065.00	
Expenses for 3 trips (345 days)		48,195.00
		$15,255.00
Per annum @ $44.25 per day.....		$16,151.00

(or 12.91/100 % p. a.)

Taking ruling rates, profits would be increased by at least (per annum).	$47,736.00
Total profits per annum.....	$63,887.00

(or over 51.1% per annum).

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"Matsonia," flagship of the Matson fleet. A new vessel is now building at the Union Iron Works which will be practically a duplicate of this fine craft.

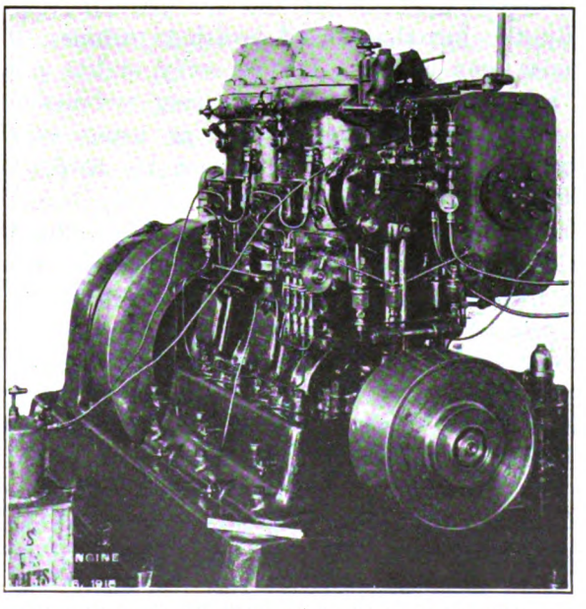
AUXILIARIES FOR BIG SCHOONERS.

The latest concern to seriously take up the semi-Diesel engine as an auxiliary is the Matson Navigation Company. This move is in line with the splendid spirit of progress that has permeated the Matson management for years and marks another step in the endeavor to give the Hawaiian Islands as fine connections with the United States as exist anywhere. The announcement that this concern is to build a large steamer at the Union Iron Works, which in connection with the "Matsonia" and "Manoa," will give them three splendid, modern passenger and freight liners, is sufficient evidence of its material advancement, while the fact that during all the "sky-rocketing" of freight rates during the past year the Matson Navigation never changed their old freight schedules explains in a measure the high regard in which this company is held both in Honolulu and San Francisco.

While improving their steamship service, the Matson people have not neglected their fine fleet of sailing schooners and it is now announced that the well known craft "Annie Johnson" and "R. P. Rithet" will be converted into auxiliaries. Each boat is to have a 160-horsepower Bolinder engine installed and as they are used to a great extent on a regular run an accurate account may be made of their performances and conclusions reached as to the actual increase in earning power and despatch due to the use of heavy oil engines as auxiliary power. The installations have been arranged for through Henry Lund & Company, the local representatives of the Bolinder engine.

The 1915 edition of North Pacific Ports is at hand and as a reference book its valuation to the transportation world has been greatly enhanced over all previous editions. The scope of the work has been enlarged and much additional information incorporated in its pages. The gradual development of this volume's scope and usefulness bids fair to keep it well to the front as a reference book dealing with Pacific Coast ports. The Terminal Publishing Company of Portland, Seattle and San Francisco are the publishers.

It is rumored that New Jersey capitalists are having plans drawn up for a small shipbuilding and repair plant for San Diego.



Bolinder driven electric light set for U. S. tanker "Maumee."

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SUPERHEATED STEAM AND THE MERCHANT MARINE.

It is interesting to note the increased interest among marine engineers and shipowners, in the possibilities of reducing fuel bills, by the use of superheated steam. There is nothing new in the use of superheated steam aboard ship, as it was tried out, to some extent, twenty years or more ago. At that time, however, suitably designed apparatus was not available; nor was it possible to obtain steel castings or seamless steel tubing, or other materials at a reasonable cost which have since been found necessary to satisfactorily handle superheated steam. The last ten years have witnessed great progress along these lines.

As this question arises, the query is naturally made as to whether it is now possible to use superheated steam with advantage. The answer seems to be found in the fact that there are, at the present time, nearly 2000 steamers of all kinds using superheated steam, which are giving entire satisfaction to the owners. Superheat up to 225° Fahr. is being used in marine practice, the tendency apparently being towards higher, rather than the low and moderate degrees of superheat. In this country, on both the Atlantic and Pacific Coasts, steamers are now under construction which will include superheater equipment. The Union Iron Works of San Francisco have perhaps been the leaders on the West Coast installing superheating equipment.

At the recent meeting of the International Engineering Congress at the Panama-Pacific International Exposition, the question of superheated steam was noticeably in the minds of the authors of several of the papers presented. From Lieut. Commander H. C. Dinger's paper, the following is quoted:

"By the introduction of cruising turbines, the turbines may secure a fair economy at low powers, but even with the best cruising turbines the well designed reciprocating engine using superheated steam has an advantage of 5% to 8% at 12 knots speed."

This statement was brought out in the discussion of the various forms of turbines which have been tried out, and it is somewhat surprising to find that a reciprocating engine with highly superheated steam can exceed in efficiency, the performance of a well designed marine turbine.

In a recent issue of the well known English marine journal, Fairplay, an interesting article was printed, showing the results obtained on Lowden & Company's S. S. "Ferrona," operating with steam superheated 200 degrees. The fuel consumption reported was 1.24 lbs. per I.H.P. hour for all purposes and 1.15 lbs. per I.H.P. for propelling purposes only. The writer of the article says with reference to the performance of this ship:

"Ship managers from their experience will agree that these figures represent just about 15% lower fuel consumption than a similar ship, with saturated steam. A saving of four tons of coal per day and the equivalent saving in bunker space available for cargo, will show that the additional capital cost of superheating of approximately 18s. (or about $4.50) per maximum I.H.P. developed should be quickly repaid."

Quite recently an ocean-going tug on the Atlantic Coast was equipped with a high degree fire tube superheater and the results of its tests are awaited with considerable interest. It is only fair to expect that a fuel economy of about 15% may be realized on this boat, which has triple expansion engines. It is rumored that there are other steamers on the Atlantic Coast which will have this type of apparatus in the near future.

With the many conditions which at present confront the shipowners, the necessity for cutting down operating expenses is more pressing than ever before. There is the Seaman's Bill; the decided possibility of even more stringent laws being passed, which will further increase the operating expense; there are the strikes and labor difficulties, with ensuing increase of wages; and besides there is the gradual increase in cost of fuel. All wide-awake shipowners appreciate these facts, and it is believed that they are becoming more keenly alive to the necessity for increased efficiency in the operation of their ships.

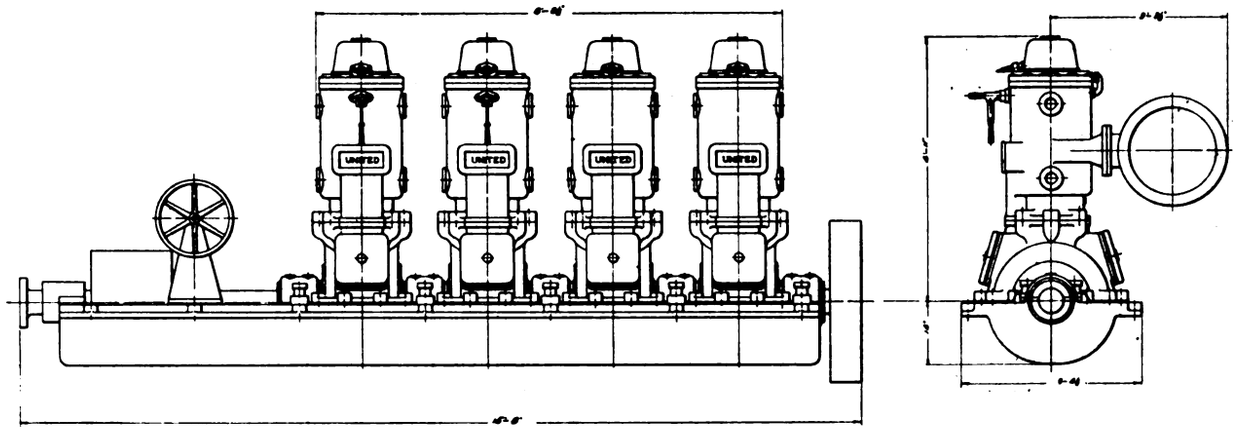
The following table is of interest as showing what may be expected for fuel consumption, in passenger and cargo steamers in ocean or coastwise service:

Draft.	Type of Engines	I.H.P.	Lbs. of Coal (13500 B. T. U.'s) per I.H.P.		
			Sat. Steam	Superheated 100°	Steam 200°
Natural	Comp.	200- 500	2.00	1.85	1.60
	Triple	500-1500	1.70	1.60	1.45
		1500-3000	1.60	1.50	1.35
Forced	Comp.	200- 500	1.85	1.70	1.50
	Triple	500-1500	1.60	1.50	1.25
		1500-3000	1.50	1.40	1.25

From a layman's point of view, it would appear that steam superheating will be adopted on board ship, as it has been in the past five or six years, on practically all the railroads in this country and Canada.

The George Stratford Oakum Company of Jersey City, New Jersey, announce that they are in the market for soft fibre tarred hemp rope. The rope will be accepted in any quantity, small or large, and the prices being paid for it are higher than for several years past owing to the cutting off of European sources of supply during the war.

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The United Engineering Works' semi-Diesel heavy oil engine is the result of years of experimenting to arrive at the acme of simplicity and durability.

Powered Schooner for Mexican Waters

THERE has been a rather sudden quickening of the interest in oil engines as auxiliary power for vessels that has been manifested on the Pacific Coast for some years past and one of the latest installations to be actually put under way is the motor-schooner "General S. G. Mariscal." This craft is now building at the yards of the United Engineering Works and is 92 feet long, 25 feet beam and 9½ feet depth of hold and draws 9 feet loaded. The "Mariscal" is schooner rigged with a leg of mutton sail on the main mast. She has a raised forecastle in which are accommodations for eight men. Below deck and aft of the chain locker bulkhead is a clear hold 46 feet in length, served through an overall hatch 10 feet by 12 feet in the clear. Aft of the hold is the engine-room housing a four-cylinder, direct reversible, Gray-United Engineering Works heavy oil engine. Aft of the main mast is a deck house containing living quarters for the purser, two engineers, two cooks, a mess room and galley and a provision store room. Aft of this house is fitted a large fuel oil tank of about 3000 gallons capacity. Over the deck house is a bridge house with a raised wheel house on its forward end and quarters for the Captain and his two mates aft. Two 16-foot life-boats are carried aft on the bridge. The general arrangement of the vessel as well as much of her constructional detail is clearly shown on the accompanying plates.

A great deal of interest centers in the engine installation of the "Mariscal," her motor representing the results of years of experimentation by the United Engineering Works. The slow progress of marine Diesel and semi-Diesel engines on the Pacific Coast, unless all signs fail, is about to be greatly accelerated and while the spirit of conservatism among ship owners has been disheartening to the builders of internal combustion engines, it has served to bring the United Engineering Works' semi-Diesel to a well-advanced stage in design as its backers have never lost faith in their ultimate success and have spared neither time nor expense in experimenting with and improving their original engines built for testing purposes.

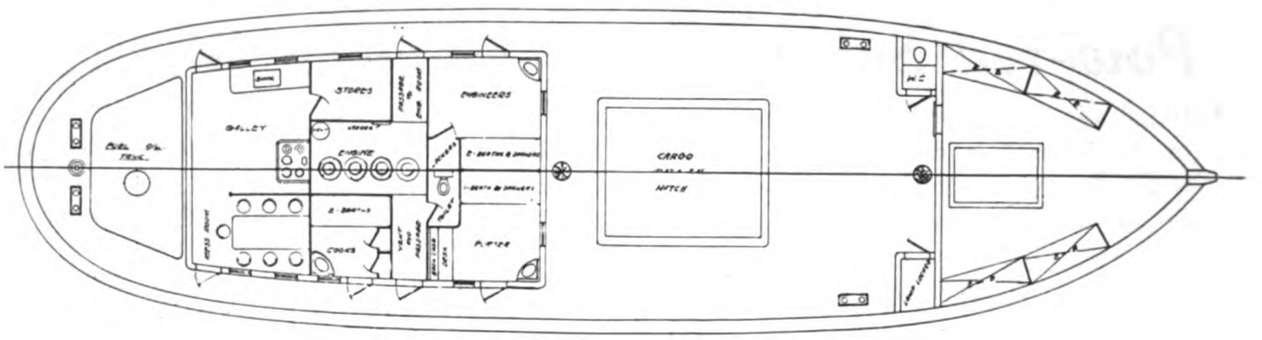
The construction of the United Engineering Works' semi-Diesel is so simple that the possibility of stoppage is reduced to a minimum. It requires a very small amount of attention while running and the fuel cost will not exceed 1/5 of a cent per B.H.P. hour when using Star fuel oil or a like grade. The exhaust and inlet valves are entirely eliminated in this engine. The initial explosions in the cylinder are obtained by heating a portion of the cylinder head with a gasoline torch, this torch being a fixture. After a few revolutions the head absorbs sufficient heat to continually carry on the cycle, the torch is put out, and the engine will operate continuously under light or heavy load until the fuel injection is cut off. It requires from 12 to 18 minutes to start the engine, depending upon its size. It may remain stopped for as long as twenty minutes and be started again without the use of the torch. Air is used to give the engine its initial impulse. This air is supplied by a small compressor attached to the engine and is stored in suitable steel tanks. The main bearings are of the ring oiling type, requiring oil about once each week, while the piston, crank-pin and gudgeon-pin are supplied from a battery sight feed requiring practically no attention. This engine will operate successfully on Star fuel oil, stove distillate, kerosene or toppings, in fact any oil that can be successfully handled by the injection pump or any fuel used by a Diesel engine. It is directly reversible by air, no gears being used for backing.

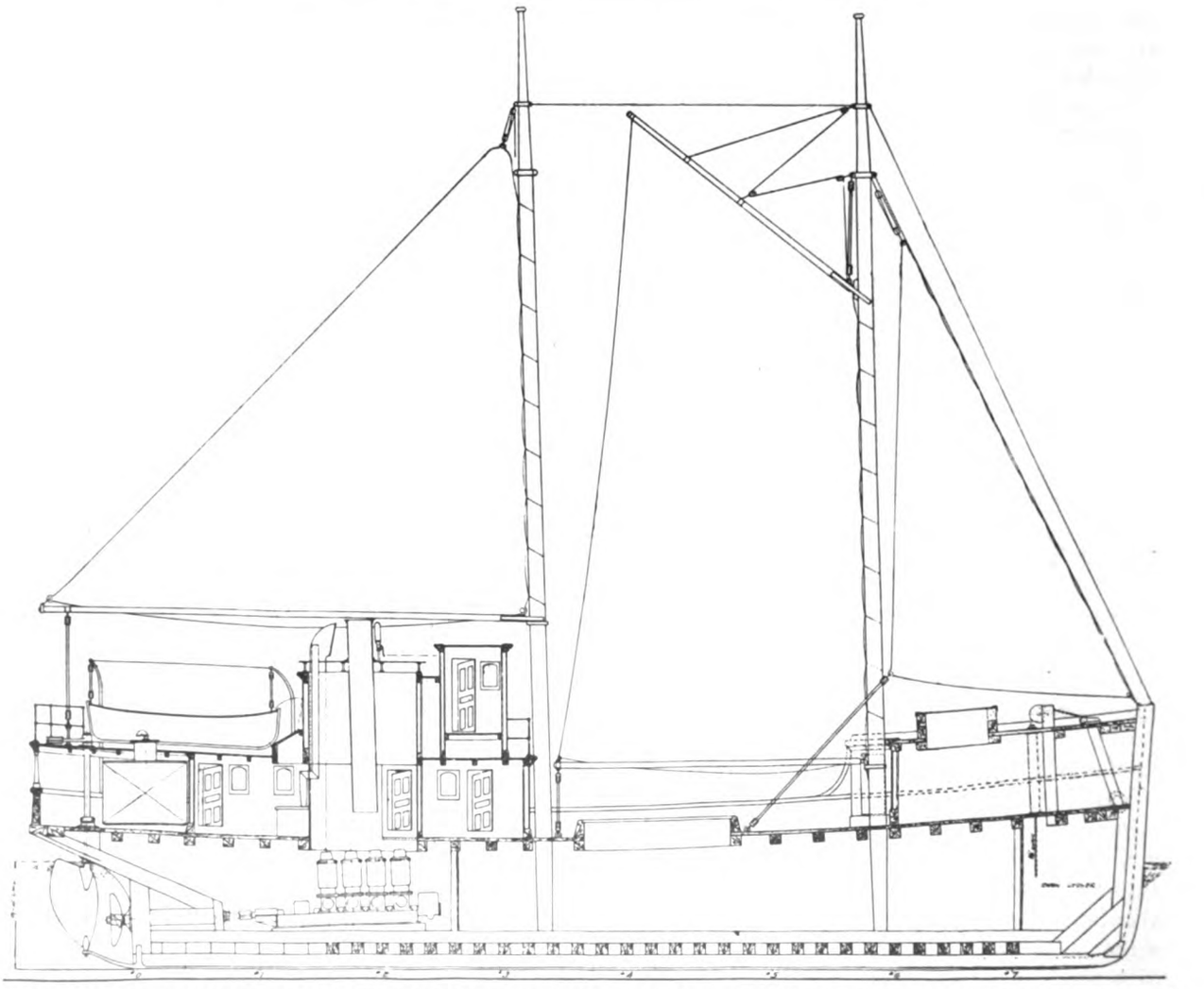
One of the important launchings of the month just passed was that of the new American-Hawaiian steamer, the "Floridian" at the yards of the Maryland Steel Company.

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River Barges Coming to Their Own

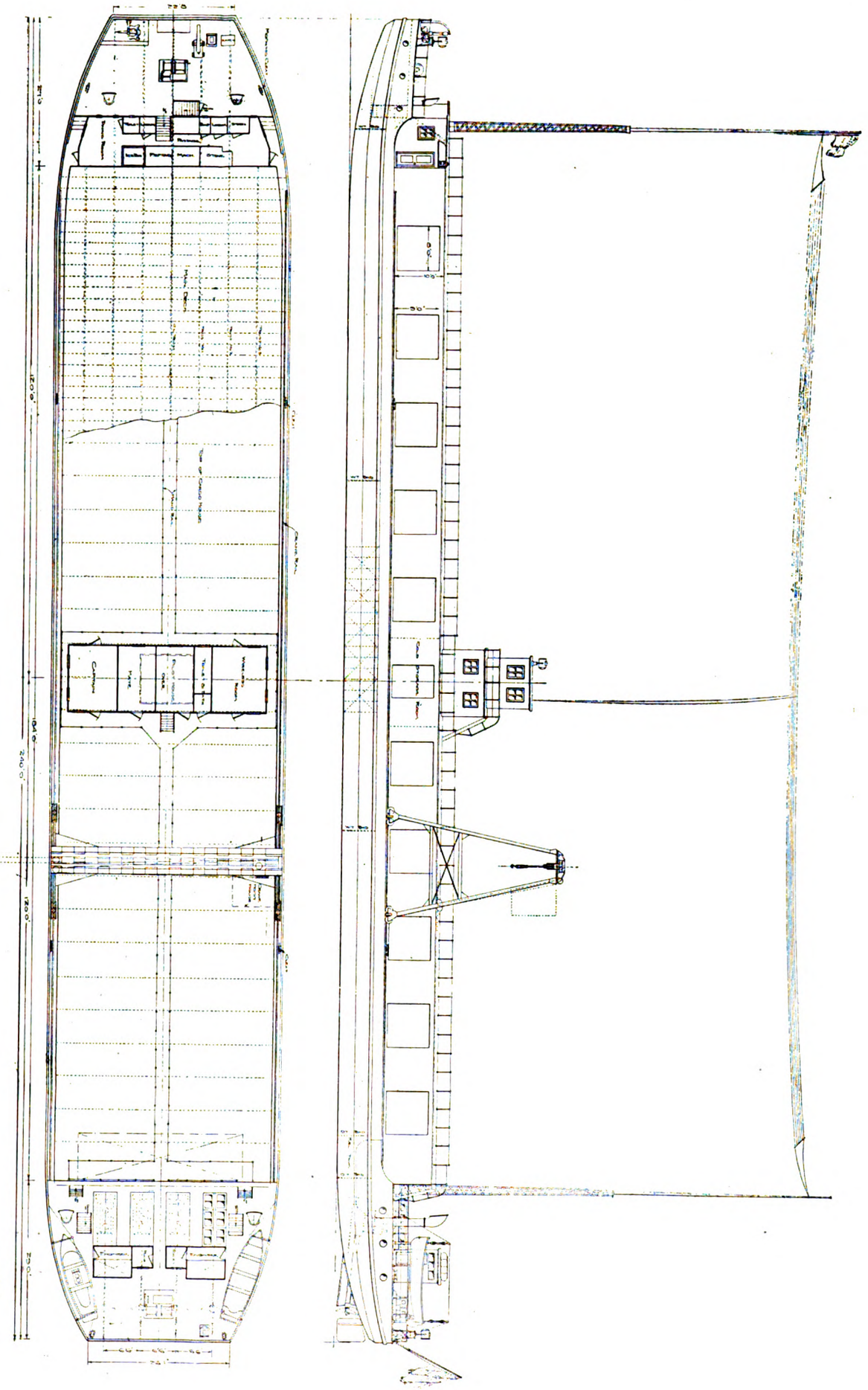
AS A RESULT of the performance of barges built for the Alabama, New Orleans Transportation Company, which now gradually are being accepted by the shipping public as the correct barges and as the type of boats which will effectively revive Inland Navigation, Mr. John H. Bernhard recently succeeded in organizing the Inland Navigation Company, capitalized at $9,000,000, and incorporated under the laws of the State of Delaware on June 3rd. The company will build a fleet of thirty-six self-propelled barges for the Mississippi River and its tributaries, ranging from 500 to 3000-ton carrying capacity. These barges will be built to draw as little as three and one-half feet of water and at a maximum draft of seven feet, will carry 3,000 tons. The first barge was launched in the latter part of August. The barge is equipped with four engines and four propellers. The quadrupling of this plant makes it practically immune against a breakdown; it is 240′ long, 42′ wide and 6′ load draft, but the larger barges are 300′ long, 56′ wide and 9′ load draft. The barge is of entire steel construction and is equipped with a weather-proof steel cargo





The "General S. G. Mariscal," an auxiliary trading schooner now building at the United Engineering Works for service on the west coast of Mexico. The "Mariscal" is to have a 150 h.-p. Gray-semi-Diesel installed.

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The Bernhard barge. The operation of these barges on the great central river system of our country will be watched with keen interest, as both economy of propulsion and economy of freight handling have been carefully worked out.

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box, which is in its entirety removable or in portions, which will permit the economical carrying of bulk cargo that does not require a cargo box. The barge is further equipped with a Clothel refrigerating plant, providing sufficient refrigerating for 200 tons of freight, such as beer, molasses or fruits. The barge attains a speed of twelve miles per hour and operates on gas, which is generated on board. Temporarily, the first barge is equipped with crude oil engines, but they are so constructed that at an early date these engines can be changed to gas engines, as soon as the proper number of marine gas engineers, not yet available, have been developed. The fuel consumption is, even with the crude oil engines, remarkably low. A similar barge is now being constructed, which barge will be equipped with Diesel engines. In this manner the company will be able to satisfy itself from actual experience what propelling power is the best in the long run. In order to make possible the continuous control of the movement of the barges and to keep the pilots and captains from violating the rules or to enable the company to assist the barge whenever grounded, they are equipped with DeForest radio telegraph, which will permit the company to be continually in touch with the barges, since these barges will have among the crew two wireless operators, one on duty all the time. This is a particular advantage for the distribution of freight and by having the wireless operator also the freight clerk on board, the manifest bills of lading, etc., can be much easier made out and kept track of, both at the office and on the barge. Further, the barge will have DeForest radio telephone, so that the captain can talk with the superintendent in charge of the landing stations at least five hours before arrival, stating exactly what particular cargo he will want unloaded, what portion of the ship he wants to have loaded or unloaded first, when he will arrive, how fast he will want to unload and exactly where he is going to lie.

One of the hulls is being built by the Howard Ship Yards Company at Jeffersonville, Ind., and the machinery is furnished by Fairbanks, Morse & Co., of Chicago, who also furnished an electric traveling crane which straddles the entire cargo box and travels over its entire length. This electric crane can carry three tons at a time and will have a loading and unloading capacity of 150 tons per hour. The boom of the crane is telescopic and may be extended as far as 80′ outboard, practically touching any rail track or warehouse within reasonable distance of the shore. The barge is further equipped with a telephone system for navigation, which places the watch at the bow, the quartermaster at the wheel, the watch at the stern and the officer on watch and the engineer on duty continuously in telephonic communication,—the so-called spider system, permitting anyone to talk to any of the other persons at will. This, of course, will facilitate also the maneuvering of the barge upon landing or leaving the terminals. The barge is further equipped with three powerful searchlights, a fast launch, a new patent designed anchor placer, electric heating, etc. There is absolutely no fire on board and the barge being entirely of steel the fire risk is practically negligible. She also carries two electric trucks that can quickly travel from over the flush deck, which has absolutely no hatches or openings, to the shore or vice versa. The many side openings in the cargo box make every part of the cargo space easily accessible.

With this type of boat, which has many other improvements not mentioned, the owners feel confident that a revival of inland navigation will take place. The barge is the result of many years of hard study and experimenting as a transportation engineer by Mr. John H. Bernhard on the problem of inland navigation in many countries, and more especially as the result of his work on the inland waters of Alabama, Louisiana, Texas, Mississippi and Florida. Before deciding on what type of boat he would build, however, he sent in August of last year a thousand-ton self-propelled steel barge from New Orleans to St. Paul and back again, and the above described barge is a result of the data then obtained.



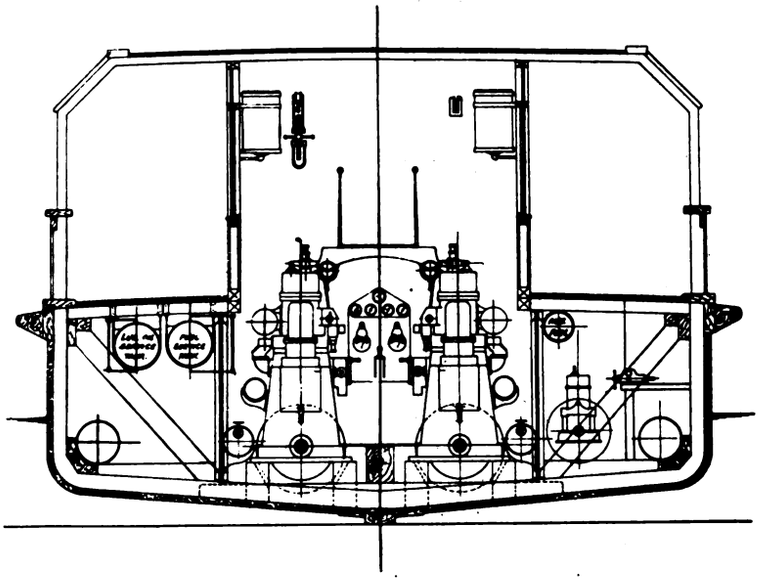
The Chinese junk. This is a type of craft that the Chinese are leaving to engage in promoting steamship lines.

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THE SOUTHWARK-HARRIS ENGINE.

The Southwark-Harris Valveless Engine, Diesel principle, is a vertical, multi-cylinder, two-cycle engine of the step piston type, and embodies in its design the best features of marine steam engine practice. Some of the distinguishing features of the Southwark-Harris engine are as follows:

First: Instead of admitting cold, high pressure air into the working cylinder to start up or reverse, the step pistons are by a novel arrangement converted into air motors and operate with low pressure air. In starting up air is at first admitted to the step cylinders, which are enlarged cylinders below the working cylinders, and which are alternately air motors and scavenging pumps without either function interfering with the other. This air starting on the step piston enables the engine to be designed only for its working pressures, approximately 500 pounds. The one great advantage, however, of the air starting on the step piston is the fact that cold, high pressure air is never admitted into the hot working cylinder.



A typical marine installation of the Southwark-Harris valveless engine.

Second: The Southwark-Harris Valveless Engine, having port inlet and port exhaust and air starting on the step piston, does not have any valves in its cylinder head, there being only one small opening, that for the atomizer, and consequently the cylinder head is a very simple casting.

Third: In ordinary Diesel engines of the trunk piston type it is necessary to give the pistons considerable clearance between the piston and walls of the cylinder on account of the expansion of the pistons.

In the Southwark-Harris Valveless Engine the wrist pin is comparatively cool in the step or lower piston which practically does not expand, therefore it can be a nice fit in the lower cylinder and acts as a circular crosshead guide for the main piston. In the larger sizes an adjustable marine type of crosshead guide is combined with and forms a part of the step piston. The main pistons can have ample clearance between themselves and the walls of the cylinder and "let the rings do the work they are there for."

Another advantage of these step pistons acting as scavenging pumps is that they draw in upon themselves and around the working piston on its outgoing stroke a charge of atmospheric air for scavenging purposes. This air helps to cool the working pistons and the air itself at the same time is thus slightly heated. It is, therefore, apparent that when this scavenging air enters the working cylinders it is never cold.

Fourth: The engine governs on a special variable stroke principle controlled by the governor. Once the line is cleared of air there is a solid stream of oil from the service tanks to the atomizer, and the slightest movement of the pump plunger produces a corresponding movement in the column of oil.

The oil is delivered from the service tank to the pumps under air pressure, taken care of by the engine, which may be anything from five pounds to one hundred pounds, making it immaterial where the service tank is located. This carrying of oil under pressure is also a great advantage in using the heavier asphalt base oils which have to be preheated in that being under pressure the lighter distillates are not given off by heating as they would be in an open service tank or stand pipe, and again, if the oil is thick and slow moving a higher pressure can be used to force it through the lines. This it would not be possible to do with engines governing on a delicate valve.

Fifth: The engine can stand idle for weeks and be started in a few seconds without hand pumping, owing to the method in use in its pumping and atomizer arrangements.

Sixth: The Southwark engine starts under load like a steam engine. In starting or reversing the action is similar to starting up a steam engine with an air pressure of from 175 pounds to, say, 300 pounds. This air, when allowed to act on the step pistons, will turn the engine over even with its load on so long as the engineer desires to do so, and after the momentum of the engine is built up the oil can be given to the main cylinders, the air still being allowed to act on the step pistons. This will augment the power being developed from the main pistons, and if the engineer desires it both the main and the step pistons can be acting at the same time, the former on oil and the latter on air. This feature

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alone is a distinctive advantage in the application of the Southwark-Harris Valveless Engine, and it enables the ship to respond more quickly and with more certainty in the case of reversing from full speed ahead to full speed astern or vice versa.

Seventh: The reversing is done by moving one rod on each cylinder. No power is required, except that which can be exerted by hand, by the engineer, regardless of the size of the engine. The same wheel or lever which admits the starting air and the fuel oil controls the movement of these rods. This does away with a lot of small air valves and by-pass valves, levers and extra shafting, and the loose feathers in the cam shaft, and the danger of this important member shifting from its exact setting.

Eighth: The entire handling or control of the engine is done by one handwheel and it is not necessary to open or close any air or oil valves while changing from full ahead to full astern.

The Southwark-Harris engine was recently inspected by a European engineer noted as an autnority on Diesel engines, and after his inspection he summed up his comments by saying that it was a "simplified Diesel."

The yacht "Southwark," 98′ x 16′ x 7′, in which is installed a 150 B.H.P. Southwark-Harris engine, recently made the round trip from Philadelphia to New York, a distance of approximately 600 miles, in 53 hours at a fuel cost of $8.20 and an expense of $1.84 for lubricating oil.

The Southwark Foundry & Machine Company, which recently acquired the license to build this engine under patents of Leonard B. Harris, A.I.N.A., has recently secured contracts for a number of these engines for both marine and stationary service, and is anticipating a large business with this engine owing to the numerous inquiries and universally favorable comments received since the yacht "Southwark" was placed in commission a few months ago.

DISCRIMINATION.

Below will be found a Department of Commerce ruling on the application of Section 14 of the Seamen's Act:

1. Section 14 of the act will apply on and after November 4, 1915, to steam vessels of the United States referred to in the act, except such steam vessels admitted to American registry under the ship registry act of August 18, 1914.

2. Section 14 will apply on and after September 4, 1916, to steam vessels of the United States admitted to American registry under the ship registry act of August 18, 1914.

3. Section 14 will not apply at any time to—

(a) Foreign steamers not carrying passengers to or from the United States.

(b) Foreign steamers carrying passengers to the United States.

4. Section 14 will apply on and after March 4, 1916, to foreign steamers carrying passengers from the United States under the flags of those countries whose inspection laws do not approximate those of the United States, unless in the meantime those countries adopt inspection laws approximating those of the United States and accord reciprocal privileges to vessels of the United States in their ports.

5. Section 14 will not apply to foreign steamers carrying passengers from the United States under the flags of those countries whose inspection laws approximate those of the United States and that have entered into reciprocal relations with the United States. The countries which have such approximate laws and which have entered into such relations are Denmark, France, Germany, Great Britain, Canada, New South Wales, New Zealand, Japan, The Netherlands, and Norway.

WILLIAM C. REDFIELD,
Secretary.

Now Lloyd's Register for 1914-1915 gives the world 49,089,552 gross tons of shipping and if we eliminate the total American tonnage for that period of 5,368,194 tons we have a total foreign shipping of 43,721,358 tons. The Department of Commerce ruling eliminates Denmark, France, Germany, Great Britain, Canada, New South Wales, New Zealand, Japan, The Netherlands and Norway from the force of Section 14 of the Seamen's Act and the shipping of these countries amounts to 35,355,527 tons or 81.1% of the total shipping belonging to all foreign countries. Under these circumstances is it not the height of folly to maintain that the Seamen's Act is not a discriminatory measure which falls heavily athwart the bows of American shipping and at the same time makes sheep of some and goats of others amid the foreign merchant marines. Why should the shipping of Austria, Greece, Russia, Spain, Sweden and Italy be gathered within the radius of the Seamen's Act club while the great shipping powers remain beyond its reach, in some respects at least?

At the annual meeting of the directors of the Pacific-Alaska Steamship Company, H. F. Alexander was re-elected president, T. E. Wilcox of Portland, first vice-president; S. A. Perkins of Tacoma, second vice-president; William Jones of Tacoma, treasurer, and Colonel D. C. Jackling of San Francisco, M. A. Arnold, James D. Hoge and E. A. Stuart of Seattle, and R. P. Buchart of Vancouver were elected to the directorate of the company.

The departure of the popular steamer "China," under the house flag of the new China Mail Line, for which the Pacific Mail Steamship Company is acting as agents, seems to indicate a prosperous career for the new organization as "the handsomest ship on the Pacific" carried her full capacity both in passengers and freight.

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Pacific Coast Shipping Notes

Travel and commerce between the mainland and the Hawaiian Islands has been dealt a most favorable hand in the recent announcement of Mr. Cal E. Stone, general traffic manager of the Great Northern Pacific Steamship Company, that one of the world's fastest ocean greyhounds would be put into a service between San Francisco and Los Angeles (San Pedro) and Hilo and Honolulu.

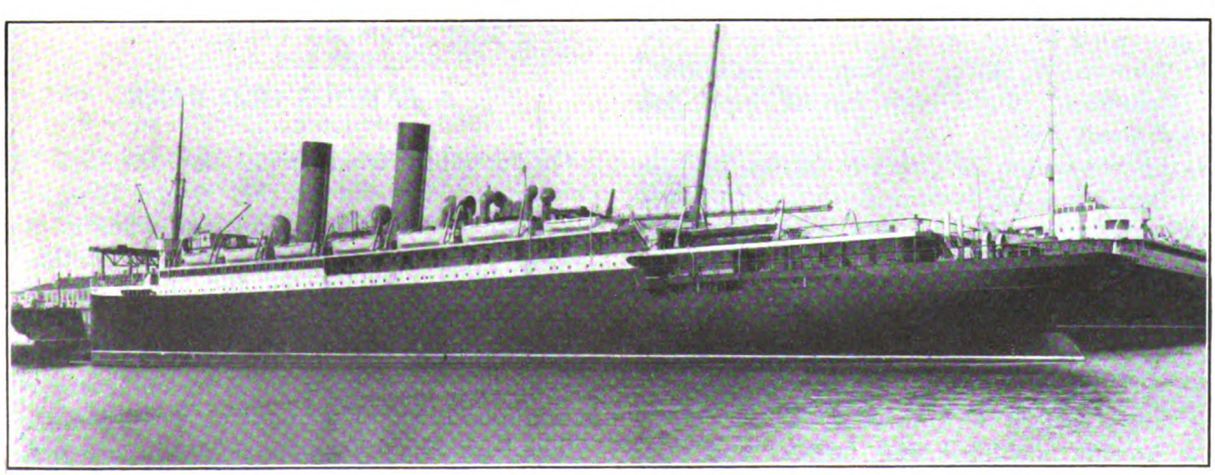
The run from the southern California seaport to Hilo and also the direct trip from Honolulu to San Francisco will be made in the remarkable time of four and one-half days. The company will use one of their "Palaces of the Pacific," namely, the S. S. "Great Northern," sister ship of the S. S. "Northern Pacific," these vessels being the swiftest flying the American flag, and are without a doubt the peer of American constructed ships. The time between the mainland and the islands at present is six days, so one may readily see the great advantage that this quick service will mean to the business man and the markets as well as affording an unexcelled route for the tourist to visit the South Sea island mecca.

The fruit markets of the United States will be able to have bananas and fresh pineapples in much better condition than heretofore as this saving of at least a day and a half in transit is of great importance with the latter perishables.

The first trip of the turbiner "Great Northern" will call for her departure on November 26 from the Golden Gate, sailing twenty-four hours later from the harbor of Los Angeles for Hilo, arriving there for a short stop, affording passengers a view of the volcano Kilauea by day and night, and thence to Honolulu, where a three-day stop will be made, enabling passengers to enjoy the wonders of this Paradise of the Pacific.

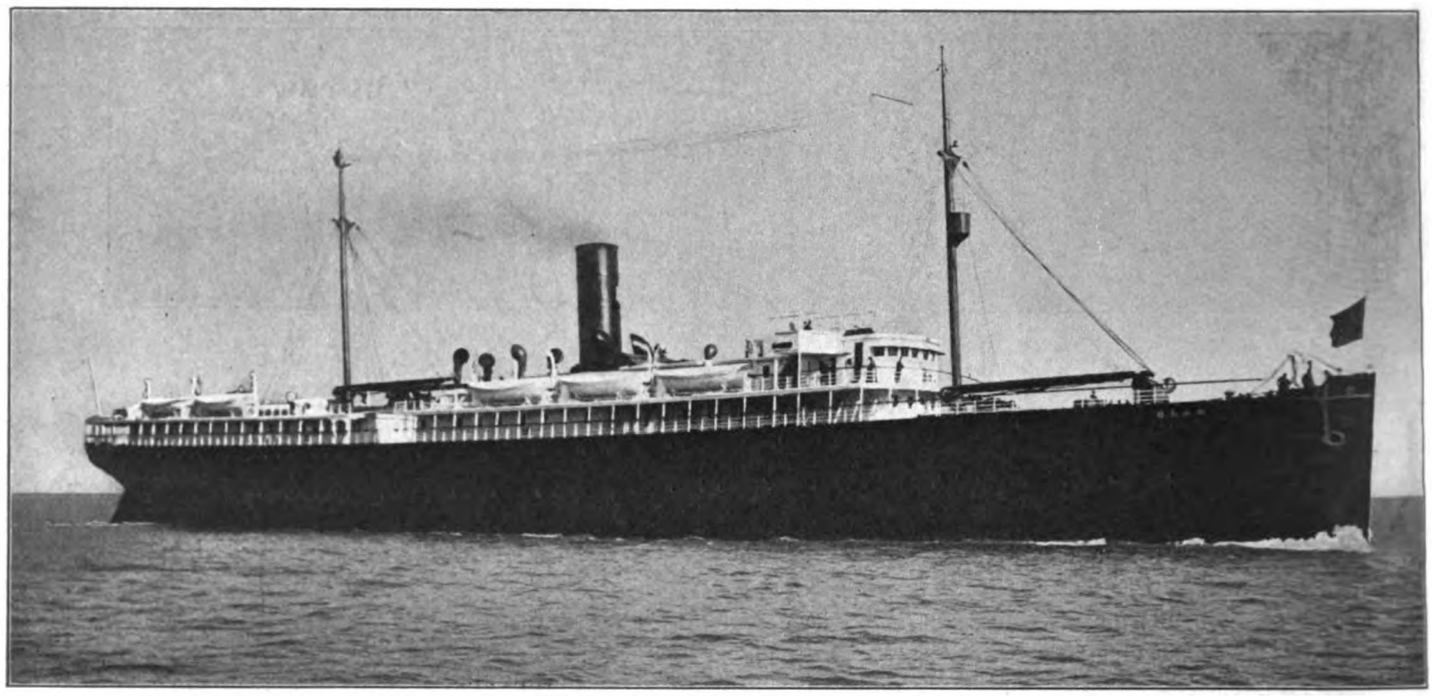
Passengers do not live aboard the vessel while in port. A schedule will be maintained that calls for a sailing every twenty days from San Francisco. The call at San Pedro enables passengers from Los Angeles and other Southern California cities to reach the Islands without making the trip to San Francisco on the outbound voyage.

Mr. Stone and Mr. C. W. Wiley, Marine Superintendent of the steamship company, both made an extended trip to Honolulu recently to look over the field as to the advisability of entering the service. The demoralized condition of service, due in a great measure to the withdrawal of the Pacific Mail Company, which now makes it almost impossible to secure passage in either direction without a lengthy period of reservation, is responsible for the action of the Hill interests in taking the popular liner from the coastwise run and having her compete with the vessels of the Oceanic Steamship Company and the Matson Navigation Company.



The "Great Northern," which is to shortly inaugurate a new triangular service between San Francisco, Honolulu and San Pedro.

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The "Bear" of the San Francisco and Portland Steamship Company's fleet.

A Company With a Long Record

THE San Francisco and Portland S. S. Co., with its antecedents, is perhaps the oldest steamship line plying upon the Pacific Coast. In the days prior to the discovery of gold in California immigrant trains were crossing the Nevada desert, settling the upper reaches of the Willamette Valley, and engaging themselves in agricultural pursuits which made only for their self-sustenance; but with the discovery of gold in California and the resulting large increase of the population of that State, a market was created for the Oregon products. To supply this market it became necessary for transportation to be established, and in the 50's the Oregon Packet Company was formed, operating one side-wheel steamship, called the "Oriflamme." This was added to in due course by two other sidewheelers, the "Ajax" and the "Orizaba," which were in turn succeeded by the stern screw steamers "Oregon," "George W. Elder," "State of California," and "Columbia," these craft having been constructed about 1888.

As the population of the two States and the interchange of traffic increased, the modern vessels, the "Bear," the "Beaver," and the "Rose City," were placed on the route, so that to-day the traffic is served by the most modern and up-to-date facilities.

Shortly after the line was first established, the settlements began to reach further into the interior until eastern Oregon and eastern Washington became populated with farmers and stock raisers, and to afford facilities for the transportation of their output to the California market, railroads began to extend from Portland, Oregon, to the interior, being increased mile by mile until the eastern confines of the States were reached, where in due course they were joined by lines extending westward, thus forming links for transcontinental rail systems.

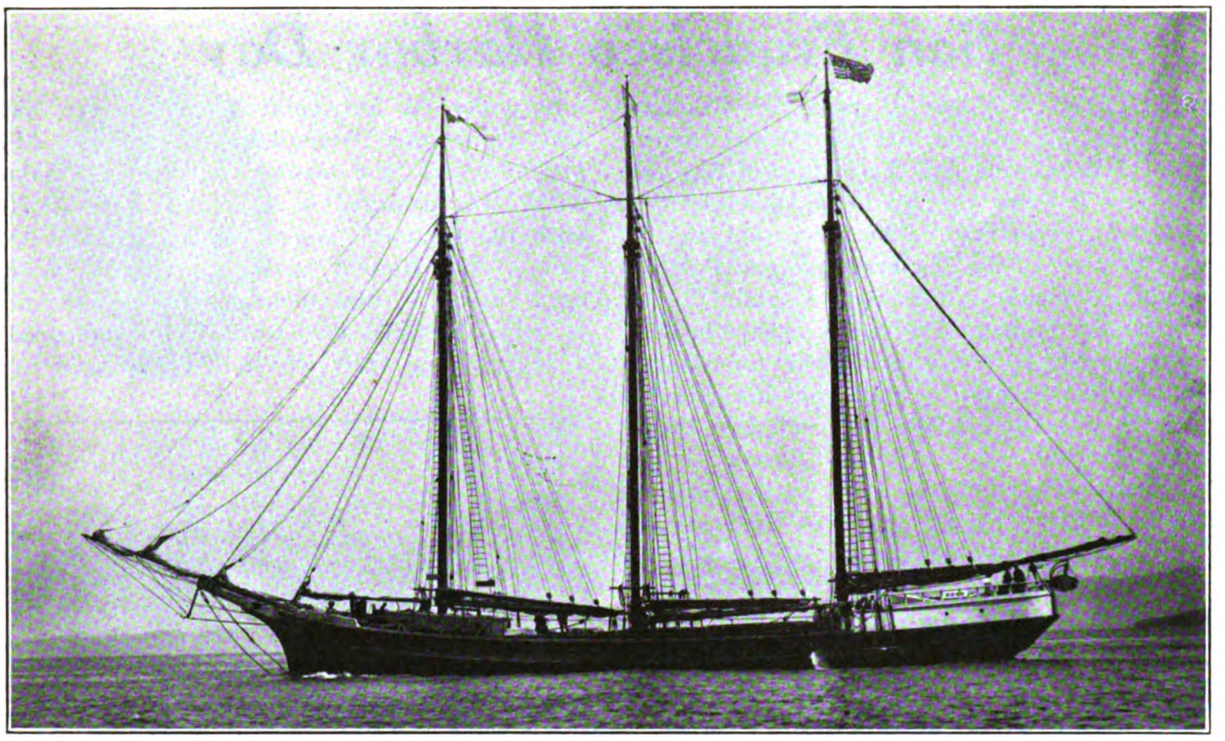
It may therefore be written that the old Oregon Packet Company, which was later succeeded by the Oregon Steam Navigation Company, then by the Ocean Division of the Oregon Railroad and Navigation Company, and then by the present-day corporation, the San Francisco and Portland Steamship Company, was the pioneer water carrier plying north of San Francisco, and therefore perhaps contributed more intimately to the manufacturing and jobbing of California than any other water line, with the possible exception of the Pacific Mail Steamship Company.

A FAMOUS OLD BARK.

On her return from Bristol Bay, the bark "Levi G. Burgess" was put on the Oregon Drydock by her owners, the Alaska Portland Packers Association. When she was taken off, the "Berlin," of the same ownership, was docked. Both vessels were found in splendid condition and only minor repairs were necessary. The owners of these two vessels take great pride in them and every effort is made to keep them in perfect condition.

The bark "Levi G. Burgess" made a record run of ten and one-half days this year from Bristol

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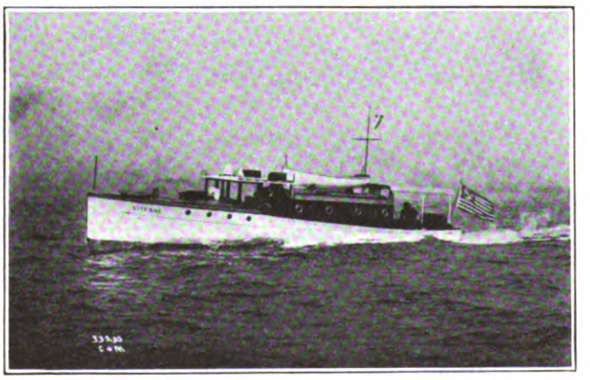
The schooner "Oregon." This fine auxiliary is powered with two 80 h.-p. engines, a 16 h.-p. hoist and a 10 h.-p. wireless set, all of the "Standard" Gas Engine Company's make.

Bay to Astoria, whence she was towed to Portland. The best previous run was thirteen days. The "Berlin" followed closely about eighteen hours later. These two vessels are owned by the Alaska Portland Packers Association of Portland. The "Burgess" was built in 1877 at Thomaston, Maine, by S. Watts, one of the famous old New England shipbuilders. She was followed about a year later by the "Snow & Burgess" from the same yard. At the time when these two vessels were built, the Government was changing the material of which its warships were constructed from wood to iron. It so happened that material had been selected by the Government for a new frigate. After having been carefully seasoned for some two years, the lumber was offered for sale as the plans for the contemplated warship had been changed to call for metal. This lumber was purchased, presumably, by S. Watts, and eventually went into the construction of the "Levi G. Burgess," a portion of it being used, however, for the "Snow & Burgess." When the former vessel was recently docked at Portland there was much interest taken in her and her history, for her bottom planking, bends, bulwark planking and, in fact, the whole vessel, were found to be in absolutely sound condition. It is doubtful if there are any wooden vessels of the age of the "Burgess" in better condition and very few are those which still equal her.

Although built primarily for ferry service between Seattle and the summer residence of her owner, Mr. Edgar Ames, the express cruiser "Vitesse" has comfortable cruising accommodations for a party of four or five. Strength and seaworthiness were not sacrificed to lightness in an attempt to secure speed, yet the "Vitesse' has shown better than twenty miles an hour.

The "Vitesse" is 43′ long and 8′ beam, built by John Wilson of Seattle from designs by Lee and Brinton. Her power plant is a six cylinder Model E Van Blerck, furnished by the Pacific Marine Engine Company, motor operating at 1200 R.P.M. turning a 24x22 Hyde propeller.

The general arrangement of the "Vitesse" is as follows: Chain locker forward with hatch from deck, and separated from motor room by water-tight bulkhead. The motor room and engineer's quarters occupy the rest of the raised deck portion. The steering bridge has standing top and wind-shield, and the wheel and all control switches, etc., are mounted on the forward bulkhead.



The express cruiser "Vitesse," a smart craft with a Van Blerck motor.

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San Francisco Harbor Day

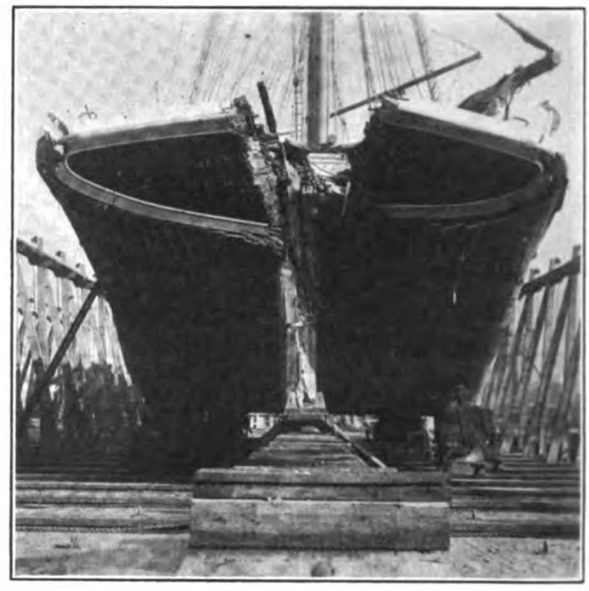
SATURDAY, October 23, was San Francisco Harbor day at the Panama-Pacific International Exposition and the feature of this celebration was a water pageant in which every type of craft was represented. The procession was led by the "Beaver" of the San Francisco and Portland Steamship Company's fleet with Captain E. W. Mason on the bridge. The experience of heading a water parade is not a novel one for Captain Mason, as for the past several years his ship has headed the water fete at the Portland Rose Carnival and his cabin on board the "Beaver" is the resting place of a handsome silver loving cup presented to the ship by the Board of Governors of the Rose Carnival. As Captain of the flagship of the San Francisco and Portland Steamship Company's fleet, Captain Mason is known to many thousands of travelers, alike for his geniality and ability, and the decision to place him and his ship at the head of the San Francisco Harbor Day parade met with general approval.

Following the "Beaver" in the order named were the following craft: steam-schooner "Brooklyn," model of the San Francisco Ferry Depot on a float in tow of "Wilder No. 2," ferryboats "Santa Clara" and "Yerba Buena," steamer "Sehome," stern-wheeler "Capitol City," launch "Crowley No. 6," tankers "J. A. Moffett," "W. S. Porter" and "Wm. F. Herrin," "Lighthouse Tender," Alaska salmon ship "Star of Finland," fireboats "David Scannel" and "Dennis Sullivan," three-masted lumber schooner "Prosper," tugs "Arabs" and "Hercules," immigration boat "Angel Island," bay oil barge in tow, pilot boat "Adventuress," bay freight barge in tow, river freight barge "Montana" in tow, derrick barge in tow, car float in tow, ocean oil barge "No. 91" in tow of "Sea Rover," self-propelled oil barge "Benicia," scow-schooner self propelled, scow-schooner in tow, Chinese shrimp boat in tow, car-ferry "Transit," quarantine tender, coast guard cutter "Golden Gate," Peterson "No. 14," police patrol boat, water boat "Water Nymph," steam fish trawler, crab and fishing boats.

The procession formed a splendid object lesson on the importance of shipping to San Francisco and gave a new meaning to the statistics which show that during the year 1914 there were 21,329 sailings of American vessels and 1208 sailings of foreign vessels in and out of San Francisco and between San Francisco and bay and inland points carrying 76,534,916 passengers and 15,867,151 tons of freight valued at $1,097,893,690.

HANLON SHIPYARD BUSY.

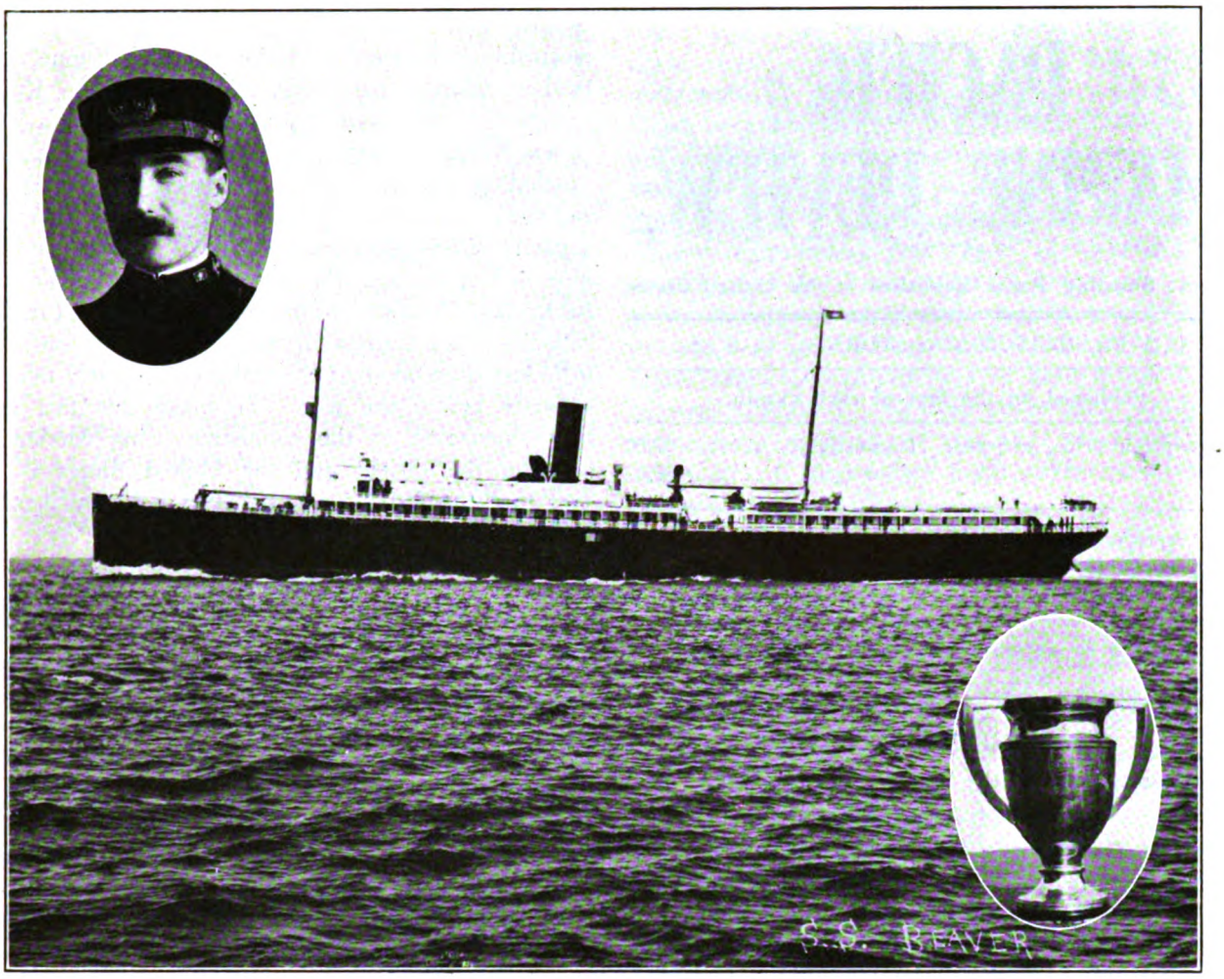
Dan Hanlon, the Oakland shipbuilder, has completed arrangements for the expansion of his business under the incorporated name of the Hanlon Dry Dock and Shipbuilding Company. At the present time the sailing schooner "Oakland," which was damaged in a collision off the Heads with the steamer "Moana" in a fog, is being repaired, Mr. Hanlon having purchased the damaged vessel. A four thousand ton marine railway is being installed and work has commenced on a kelp cutting craft which is being built to the order of the Hercules Powder Company for experimental work in the harvesting of kelp for potash. The Bolinder engined tug, "Marie L. Hanlon," which has attracted much attention among the owners and operators of small craft, has been chartered to the Shell Oil Company for bay and ocean towing.



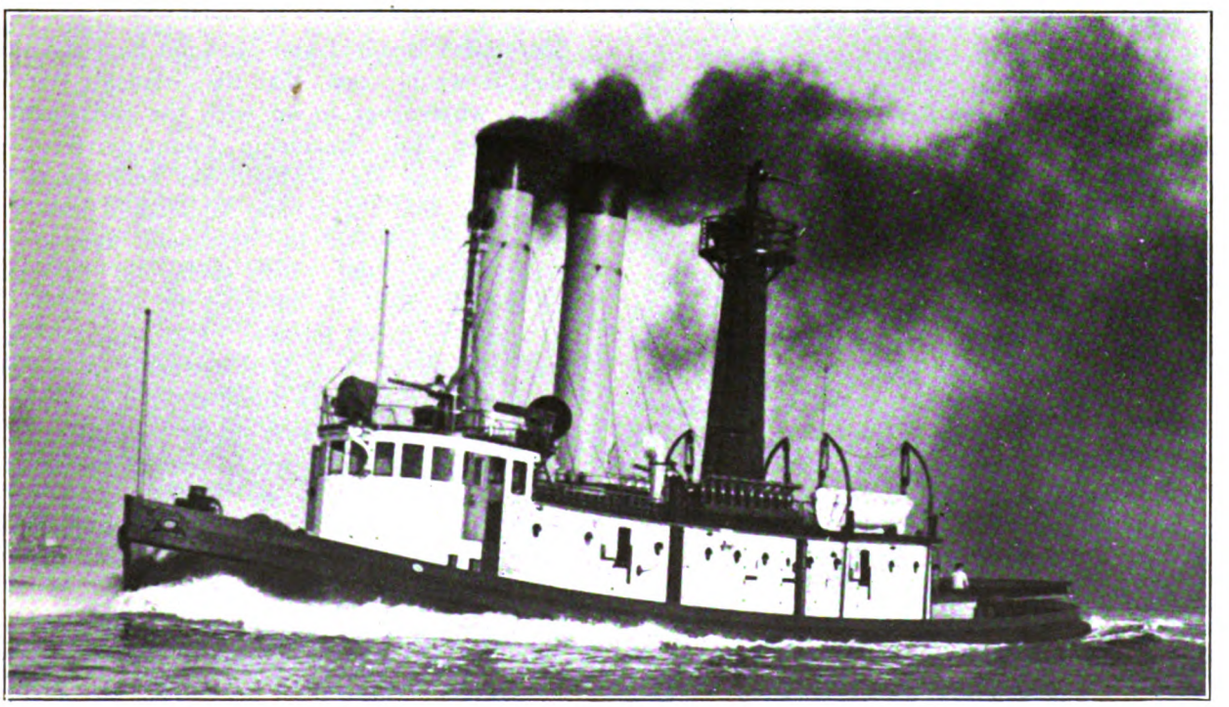
The peculiar injury to the "Oakland." This schooner has been purchased by Dan Hanlon and will be repaired.

One of the indications of the expected growth of the shipping business of San Francisco is the fact that the Atlantic Mutual Insurance Company of New York has opened an office in San Francisco for insuring marine and transportation risks. This company, which is one of the oldest and strongest of the American marine companies, is noted for its conservatism, and also for the liberal treatment of its policy holders. It is probably the best example of the value of mutual insurance when properly managed, and the record of dividends paid the company's assureds is one of the reasons why the policies of the company are considered so desirable by the shippers and vessel owners on the Atlantic Coast, where it is looked upon as one of the institutions of the shipping business.

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The steamer "Beaver," which led the San Francisco Harbor Day parade. The inserts are Captain E. W. Mason and the cup which was presented him as the repeated leader of the water parade at the Portland rose carnival.



The fire boat "Dennis Sullivan" also took part in the Harbor Day parade.

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THE SHIPPING CRISIS.

The departure of the vessels of the Pacific Mail fleet has undoubtedly precipitated a crisis in the carrying trade of the Far East. The vessels lost to the transpacific ensemble of carriers are the "Mongolia" and "Manchuria" of 27,000 tons displacement each, the "Korea" and "Siberia" of 18,000 tons displacement each, the "China" of 10,200 tons displacement, the "Persia" of 9000 tons displacement, all lost through sale, while the "Nile" of 11,000 tons displacement is under charter to the British Government and unavailable till the end of the war.

Before the war there had been available for transpacific transportation of freight a total tonnage of at least 936,000 tons actual carrying capacity per annum in vessels bound from the Far East to San Francisco or Puget Sound ports. This service was made up as follows: Twelve sailings per annum of the Royal Mail Steam Packet Company and Glen Line, twelve sailings by the Hamburg-American Line; twelve sailings by the Blue Funnel Line, twenty-four sailings by the Nippon Yusen Kaisha, twenty-four sailings by the Osaka Shosen Kaisha, seventeen sailings by the Canadian Pacific Steamship Line, four sailings by the Great Northern Steamship Company, four sailings by Dollar boats and fifty-two sailings per year by the Pacific Mail and the Toyo Kisen Kaisha on joint schedule. This gives a total of 161 sailings per year of which the Pacific Mail furnished thirty-five. The actual carrying capacity of the Pacific Mail vessels, excluding the "Nile," and operating on the schedule as outlined above, was 225,150 tons per annum or practically 25 per cent. of the carrying capacity of all vessels regularly engaged in the transpacific trade.

Immediately upon the outbreak of war, the available tonnage for transpacific business began to drop rapidly and very shortly the sailings of regular steamship lines were as follows: Blue Funnel Line twelve sailings per year, Nippon Yusen Kaisha twenty-four sailings per year, Pacific Mail and Toyo Kisen Kaisha fifty-two sailings per year, a total of (including six per year for scattered cases of special sailings) 96 sailings per year with a carrying capacity of 684,000 tons. From this tonnage we must now deduct the available tonnage of the Pacific Mail fleet, 224,000 tons, which leaves a total carrying capacity in the transpacific trade of 460,000 tons, or a little less than one-half the transpacific yearly tonnage capacity before the war. To make this fact even more menacing to the commerce being carried on between the Orient and the United States is the fact that the fall always witnesses a heavy increase in business.

It stands to reason that the Japanese lines will make every endeavor to seize the business of their erstwhile competitors but the shortage of tonnage will, nevertheless, have a baneful effect upon American commerce. It must be remembered that the whole world is suffering from a shortage of tonnage and Japan is no exception to the rule. While every shipyard in the Flowery Kingdom is working to capacity on new ships, these vessels are needed at other points beside American west coast ports, and even should the Japanese lines place every vessel they could possibly spare from other routes, all alike suffering from a shortage, at our disposal, nevertheless there will be a serious and highly harmful shortage of tonnage to face this winter and the coming spring.

WANTED, A CENSOR.

Secretaries Redfield and McAdoo have definitely settled, it would seem, that the Seamen's Act had nothing whatsoever to do with the retirement of the Pacific Mail Steamship Company from the Orient. Indeed Mr. Redfield has been quoted as maintaining that the Pacific Mail could have continued and in proof of this statement figures were offered showing the great saving in fire room force which could be effected by changing the Mail steamers to oil burners. Unfortunately, providing of course that Mr. Redfield really used these figures, they were supplied to him from an unreliable source and were badly garbled. Those familiar with shipping would recognize at once that the figures used by Mr. Redfield were faulty, but why bother with these things, it is better to let Mr. Redfield's own Department prove that his contentions are wrong.

The Department of Commerce maintains a costly but valuable service known as Commerce Reports, a daily publication issued by the Department for the purpose of keeping the American business man, the exporter, the importer and the

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ship owner alive to trade opportunities abroad. Since the very essence of such a publication is accuracy, as its value depends upon its trustworthiness, we may except these "Reports" as being, as least, fairly accurate. Very well, we quote from Commerce Reports of Thursday, October 14, page 204, as follows:

"Examination of the papers of the Pacific Mail steamship 'Korea' shows a monthly salary expenditure of about $5000, while the average monthly expenditure for salaries on a Toyo Kisen Kaisha steamer does not exceed $3000. If anything this is too high an estimate. The 'Korea' may be taken as an average sized vessel, since the Pacific Mail fleet consisted of two vessels of the size of the 'Korea,' two larger ships and only one smaller one. Taking into account the subsidy which the Toyo Kisen Kaisha receives, it costs this company about $227,860 less per year to run one ship of its fleet of four than it did the Pacific Mail Steamship Company to run one of its five ships."

Thus we see that the big American ship was handicapped to the extent of $227,860 per annum even before the passage of the Seamen's Act and as that measure meant an additional handicap, of from $100,000 to $150,000, the latitude in the figures being meant to allow for the Seamen's Union interpretation of the Act, the Pacific Mail was forced to quit as its financial statements for many years back demonstrated that it would be the height of folly to assume this additional burden.

Now since Mr. Redfield persists in saying one thing while the Commerce Reports say the other we humbly suggest that one of these sources of public information be placed under the charge of a censor.

McADOO MISINFORMED.

In addressing the San Francisco Commercial Club, Secretary McAdoo made several glaring errors that must have opened the eyes of those present who had any intimate knowledge of shipping matters. In the first place, the statement of the Secretary of the Treasury that the Pacific Mail fleet was sold at a very high price goes far to prove that Mr. McAdoo is sadly at sea on the price of shipping to-day. When the sale price of the "Mongolia" and "Manchuria," "Korea" and "Siberia" was announced in San Francisco there was genuine and widespread surprise, not at the largeness of the amount but at the fact that while shipping was bringing immense premiums all over the world, these boats were sold at practically their book value.

"The Navy alone bought at that time (the Spanish-American war) 102 vessels and paid in round numbers the fabulous sum of $18,000,000 for them. There is no officer of the Navy who knows about these purchases who won't admit that most of these vessels were junk." So says Mr. McAdoo, and there is nothing startling about this statement because most of them were junk and it is only natural to expect junk since the average price was less than $180,000 per vessel. Some of this junk is still in use, although the Government bought it seventeen years ago. Mr. McAdoo's argument that the Government, in case of war, would be at the mercy of avaricious shipowners is fully as weak as our Government would be should it allow avaricious shipowners to hold it up in time of need. Should war ever come and should the Government wish to use merchant vessels as auxiliaries, it can fix its own price either on a charter or an outright purchase.

Again, "the merchant marines of our leading rivals are, in most respects, composed of old ships with obsolete equipment." Surely a Cabinet member of a great country like the United States should never be guilty of such an absolutely silly and ignorant remark. It speaks for itself—it is the old eagle-screaming we-can-beat-the-world attitude. There is another thing which Mr. McAdoo must know and which any steamship man can tell him, and that is that a ship built to meet certain requirements for naval auxiliary use, such as the provision of structural stiffening for gun mounts, etc., loses in commercial utility in direct ratio as she gains in usefulness as a naval auxiliary.

"All of a sudden, and without adequate notice, and with utter indifference to the injuries that might be done to shippers and the interests of this country, the Pacific Mail Steamship Company sells its ships and announces that it will discontinue its service." After forcing the Pacific Mail out of business, members of the Administration go around figuratively cussing that institution. Now, Mr. Secretary, would it not be just as well to inject a little truth into that statement? The going out of business of the Pacific Mail was a matter of common knowledge and common discussion in San Francisco for six months before the event occurred, and furthermore, Congress was repeatedly informed of the coming event. Many members of Congress treated this information as a "bluff," but how many of them can truthfully say that they were not informed of the fact?

As to the operation of Government controlled steamers, Mr. McAdoo's address is too vague to stand discussion. The scheme as outlined is plausible enough, but further information must be forthcoming before a sound judgment can be formed on the scheme's advantages and disadvantages.

In our October issue, page 54, we inadvertently referred to the reduction gears to be used on the "Annette Rolph" and the "Eurania" as Westinghouse type reduction gears, whereas they should have been referred to as General Electric Company gears.

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It is not a very far cry from Grayslake, Illinois, to Madison, Wisconsin, and therefore it is only natural that the former locality should possess a publication clear sighted enough to see in under the hide of La Follettism. This publication is known as the "Searchlight" and some of the trite sentences in its August number are as follows: "Transportation is the main spring of American commerce. It has been keel-hauled by legislative blacksmiths, side-swiped by political highbinders and panhandled by labor until it is about as valuable to general business as an old-fashioned spiral bed-spring would be for a Swiss watch. However, nothing can be done towards establishing an American merchant marine until the Furuseth bill is either repealed or so substantially amended that neither its fond and doting parent nor its senatorial wet nurse would recognize it. Chlorine gas is a stimulant compared with the inevitable effect of this law upon the marine business of this country. This statutory enactment of the Seamen's Union contract was jammed through the Senate by La Follette, who had, in the furtherance of his political ambitions and largely through mendacious agitation, accomplished the ruin of the American railway transportation system in which it finds itself today. It is not surprising that a political brigand such as La Follette is, having but for the saving grace of an autotoxic condition manifested at a fortunate time for the people of this country, elevated himself to at least a potential possibility for the presidency through railroad baiting and railroad wrecking, should nail the Union Labor vote of the country by wrecking what merchant marine we have and making it impossible to extend its growth, or establish it anew. The people of this country could well afford to pay the entire membership of the Seamen's Union full union wages for the rest of their lives, and pay Mr. La Follette the salary of the presidency for the rest of his life, as a price for the repeal of Mr. Furuseth's bill.

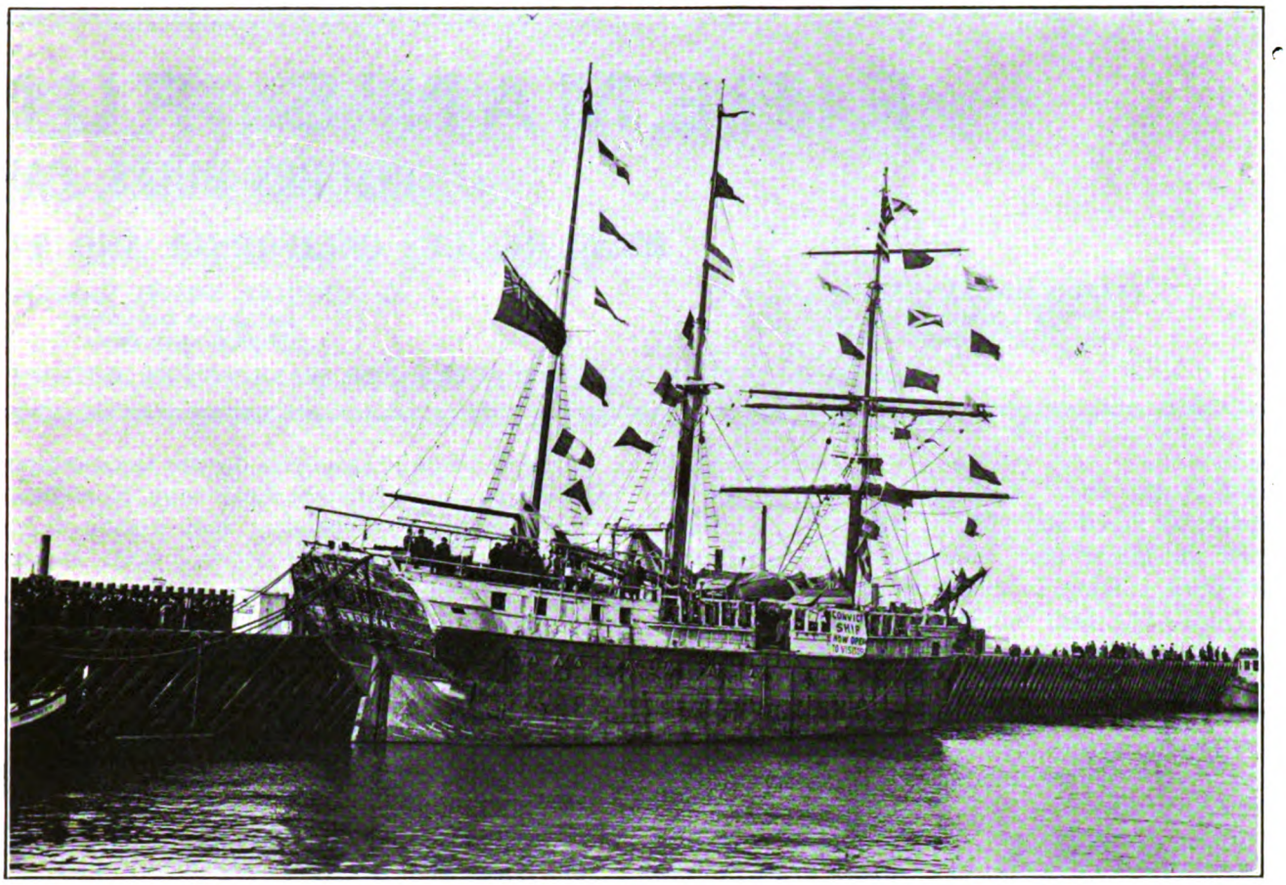
The local firm of Sudden and Christensen were the successful bidders for the German steamer "Walkure." The "Walkure" was sunk at Papeete harbor, Samoa, during the bombardment of that town by a German fleet. The vessel will be raised and brought to San Francisco for overhauling and will take out American registry. The "Walkure" is a single screw, steel, turret-decked steamer of 3836 gross and 2403 net tons. She was built in 1907 by William Doxford and Sons of Sunderland and her principal dimensions are 349 by 49 by 24 feet. She is driven by a triple expansion engine with cylinders 24, 41 and 68 inches in diameter by 45 inches stroke.

The PACIFIC MARINE REVIEW is in receipt of the initial number of the "Philippine Trade Review," a monthly import and export journal dealing with the various phases of business life in the islands. The "Trade Review" is carefully edited and contains a wide range of authentic and concise information. The first number is given over largely to the lumber industries of the Islands.



The painted sterns of the old Chinese junks were both ornamental and impervious to the Devil.

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The old prison ship "Success," which was not altogether successful in passing inspection.

REPORT OF SURVEY ON BR. BARKENTINE "SUCCESS."

Captain Smith **426 Gross Tons.**

At the request of Mr. Ernest Livingston, an interested spectator, I, the undersigned Surveyor, did, on February 3, 1915, proceed to and survey the Br. Barkentine "Success," afloat at Mission street wharf.

Survey was held for the purpose of ascertaining the general condition of the vessel and gear and equipment previously devised and used for the discomfort and unhappiness of the erstwhile passengers.

Attended on board in company with the Mayors of San Francisco and Berkeley, a California State Senator and a number of other dignitaries, moving picture operators, press agents and news scavengers from the local daily papers.

From the statements of an officer of the vessel it would appear that the "Success" was built in Burma in 1790. That she was used as a passenger vessel for some years and later converted into a floating Hell for the transportation and stowage of certain unfortunate gentlemen who coveted their neighbor's goods. Others were confined on board for various reasons, one notable case being that of a man who violated the game laws by attempting to do away with his mother-in-law during close season.

However I am of the opinion that the statements of the above mentioned officer were not to be taken without salt, as in the only case of which I have personal knowledge, the tonnage of the vessel, he toyed with the truth shamefully.

Upon examination of the vessel, found that much of the equipment, such as hand and leg irons, metal collars, cat-o'-nine tails, etc., were badly corroded and wasted away. The metal dress suit stated to have been worn by an Australian adventurer was observed to be indented in a number of places. The indentations were stated to have been made by collision with swiftly moving lead, but could have been effected with a hammer with much less risk to the wearer.

Situated just aft of the forecastle head on the main deck was a bath tub. This was absolutely unprotected and has received more or less damage through the weather conditions.

The living quarters below decks were found to be well fitted with burglar proof bars and gratings. The deck in the way of these quarters in places was badly worn and in need of attention.

The windlass, which is of the Armstrong patent, appears to be in sound condition, but more or less rusted.

Recommended.

First—That the officer whose statements I questioned be removed and renewed.

Second—That the hand and leg irons, prisoners' balls (iron), cat-o'-nine tails, etc., be overhauled, cleaned and repaired before being used again for the

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FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

purpose they were intended. That the plating of dress clothes above mentioned be removed, the indentations faired and the suit returned to and fitted upon the officer first mentioned, and secured with necessary riveting to ensure a proper job.

Third—The bath tub be subjected to hydrostatic pressure and if found tight it's a marvel.

Fourth—That additional marks be cut or scored in the bars and gratings in the doors of living quarters to represent teeth marks of prisoners. That the windlass be operated by the various Mayors, etc., to get up a sweat.

When the foregoing recommendations have been carried out, I am of the opinion that the "Success" will be entitled to confidence to transport rats from port to port.

(Signed) L. CURTIS, Surveyor.

On the first of the present month the Ker-Lloyd Iron Works went out of business. The reason leading up to this discontinuance was the loss of a large portion of the firm's regular customers on small repair work. The cessation of the Pacific Mail Steamship Company and the moving of the headquarters of the Pacific Coast Steamship Company to Seattle, this, of course, affecting the repair work carried on by that company in San Francisco, together with a tendency on the part of large steamship owners to concentrate engine room and boiler room repair work, all militated against the small independent shop practically relying upon marine repair work. Both Messrs. Charlie Ker and Bruce Lloyd are well known among shipping and engineering circles in San Francisco where their ability and integrity has always remained unquestioned, and it is with real regret that THE PACIFIC MARINE REVIEW announces the discontinuance of the Ker-Lloyd Iron Works, whose shop on Spear street had been in operation for eight years.

The Allen Dense Air Ice Machine has long been in considerable favor in the United States Navy and among the late installations on Government boats are three 3-ton machines for the U. S. Naval Tender "Melville"; two 3-ton machines each for the battleships "Oklahoma," "Nevada," "Mississippi" and "Idaho." Six one-ton machines have been constructed to replace old ½-ton machines fitted on U. S. naval vessels in the nineties, when efficient refrigerating systems for warship use were still a matter of experimentation. Two 2-ton machines have been recently built for large oil tankers and a third is now under way. H. B. Roelker of 41 Maiden Lane, New York, reports that inquiries for refrigerating machinery at the present time indicate a good lookout for 1916 business.

How Shall Our Merchant Marine Be Restored

By PERSIFOR FRAZER, JR.,
Vice-President Harlan & Hollingsworth Corp.

A SHIP complete is a world self-sustained; with this thought before us it is not so strange that our lawmakers, no matter how honestly inclined, blunder so piteously and ludicrously when they attempt to regulate our floating worlds. They are most blameworthy, however, in framing laws unaided which affect artisans of every trade, on matters of which the lawmakers are profoundly ignorant. The recently enacted and most iniquitous measure known in popular parlance as the "Seamen's Bill" calls our attention to the kind of men who go down to the sea in ships.

Properly speaking there are no able-bodied seamen needed on the vessels that plow the seas today, and none are being made. The deck-hands on a modern steamer handle lines, stand look-out watch, clean, scrape, polish bright work and paint. This is unskilled work, and requires no education or apprenticeship. For this service probably the most efficient so-called sailor is the Swede who

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ATLANTIC MARINE DEPARTMENT
37-43 WALL STREET NEW YORK
AND BRITISH COLUMBIA, 264 COLMAN BUILDING, SEATTLE, WASHINGTON

cannot read or write, and who at $18 a month performs twice the work of the same class of man the American shipowner is compelled to employ at $40 wages and an elaborate menu which averages 75 cents a day a man as against 22 cents for the foods provided for the seaman under foreign flags.

It is not the purpose to deal with statistics, but to urge with all my heart and strength the cessation of this brainless, harum-scarum, criminally ignorant legislation, all of which is built on a foundation of pitiful lack of knowledge and misconception of shipping needs. To save our maritime interests let us tear down all that is pernicious to its welfare and build anew on a solid, common sense business basis, taking advantage of the intelligence and experience of those men who have our shipping interests most at heart.

There is not an American shipping man who does not blush for shame at the thought of the disgraceful exhibition made in the name of the Nation on the occasion of the appalling disaster that befell the steamer "Titanic," when a United States Senator, as chairman of a senatorial investigating committee, publicly asked a broken, dazed survivor, dragged from the ship that rescued him and taken practically by force to Washington: "What is the difference between the 'front' and 'bow' of a ship?" and "whether when the ship was found to be sinking the passengers were placed in the watertight compartments."

At the present moment our shipping interests are being almost daily prejudiced and humiliated by an individual whose office must be respected, but whose utterances are so puerile and inane that it tempts the reader to believe that he is drawing his salary as a comedian in vaudeville. Pride of country makes him nameless. But we must come to the remedy.

First, let us drop all shipping legislation proposed and pending.

Secondly, let us change our existing navigation laws so that capital will be induced to invest in floating equipment securities in very much the same manner as it has invested in railroad bonds, which permitted the marvelously rapid development of our overland carriers. Under proper laws the investor will be amply protected in floating property by mortgages, insurance, etc., and the comparative cheapness of transportation of passengers and freight by water assures a handsome profit to the investor.

Thirdly, and this will meet with the most violent opposition from the friends of organized labor, though it is absolutely essential to the rehabilitation of our merchant marine and to the ultimate benefit of our country, we must permit the American shipowner to operate on the same basis regarding wages, food and general conditions enjoyed by shipowners operating under foreign flags.

The American boasts that he does not fear competition, that his "Yankee ingenuity" and resource will enable him to surpass his plodding foreign fellow tradesman. Put him to the test! The American boasts that he is above being in domestic service, that he is too good to clean streets; and an American mechanic will starve before he will perform unskilled or laboring work. Now, to face this situation squarely, if an American shipowner can secure the service of a deck-hand at $18 a month whose efficiency is equal to that of an American deck-hand whose wages are $40 a month, the American owner is compelled to compete under an impossible handicap, so it is only fair to him to permit him to engage his crews at the same rate as paid by foreign owners. This means that the American seafaring man is too good for the unskilled positions now offering aboard ships, so let us eliminate him unless he will put himself on an equal basis with seamen of other nations.

The cost of constructing and equipping an American vessel is approximately one-third more than for a similar vessel of foreign build, principally due to the higher wages paid in this country, and as we have seen, in our self-containing floating world, this affects every item.

The American can stand the extra first cost, because he gets a more substantial, elaborate and better job all through, and further he gets what he wants, whereas, quite on the contrary, in foreign countries the owner gets what the builders give him.

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Shipping Notes

A special meeting of the stockholders of the Pacific Mail Steamship Company was held in New York on October 13 to reduce the capital from $20,000,000 to $1,000,000 and to authorize payments to the stockholders from the proceeds of the sale of the Pacific fleet and other assets.

The submarine tender "Bushnell," built at the Seattle Construction and Dry Dock Company's plant, completed highly satisfactory trials some weeks ago. Measured mile runs, long full power and long cruising speed tests, evolutions and the testing of steering gear, anchor hoists, etc., were all attended with highly successful results.

Widmore D. Hill, for years a well known figure on Seattle's waterfront, has entered the Government Steamboat Inspection Service as assistant inspector of boilers to H. C. Lord. He steps into the vacancy created when Lord was advanced to inspector by the death of Captain Robert A. Turner.

The Alaska Steamship Company recently purchased in New York the steamers "Burlington" and "Bennington" for use as freighters on the Alaska routes. These two vessels were operated on the Great Lakes by the Rutland Transit Company in the ore-carrying trade, they are of 2285 gross tonnage and their general dimensions are 244 by 43 by 27 feet. They were built in 1908.

It is reported that the Electric Boat Company is negotiating with the Chinese Government for a large number of submarines. It is understood that the negotiations were made possible through the Bethelem Steel Corporation, that concern having earned the confidence of the Chinese Government. The Diesel engines to be placed in these submarines will be constructed by the New London Ship & Engine Company.

Harlan and Hollingsworth Corporation on September 4, launched the oil tanker "Silver Shell," building to the order of the Anglo-Saxon Petroleum Company of London. The "Silver Shell" is the first of three tankers building at this yard for the same owners. She is the largest vessel ever launched at Wilmington, being 435 feet long.

Captain A. W. Nelson, retiring skipper of the steamship "Korea," has been in the employ of the Pacific Mail for thirty years and as the author of "Yankee Swanson" and other stories is well known to others besides sea rovers.

In the October number of "The Marine Review" of Cleveland, Ohio, occurred a rather unusual error for a shipping journal. The matter in question concerns the installation of gas engines in the fleet of the San Francisco Bar Pilots' Association. A quotation from the article will suffice to show those familiar with San Francisco pilot craft what a queer muddle "The Marine Review" has gotten our "Warders of the Gate" into:

"The San Francisco Bar Pilots' Association will shortly convert their splendid fleet of schooners into auxiliaries. The action of the association is a strong tribute to the efficiency and general utility of the modern gas engine. The famous schooner 'Pathfinder' will be the first of the pilot boats to have a gas engine installed. She is probably the best known of the pilot boats and was built at Benicia, Cal., by Captain Turner in 1900. As soon as the 'Pathfinder' is launched the pilots intend to make a similar installation in 'Gracie S' and 'America.'"

It is pretty hard to accept the statement that the "Pathfinder" was built in 1900 and is to be launched sometime in the immediate future, but aside from this discrepancy the "Gracie S." is not fitted with a gas engine but her auxiliary power consists of a Bolinder Semi-Diesel oil engine, and furthermore, the "Pathfinder" went ashore on Point Bonita on January 15, 1914, in a dense fog and became a total loss.

The Ellicott Machine Corporation of Baltimore recently received a contract for three tugs for the Pennsylvania Railroad. The boats are intended for service in New York harbor and adjacent waters and are 105 by 24 by 13 feet in dimensions. They will be driven by compound engines and have powerful fire and wrecking pumps. The Ellicott Company has built up a fine reputation in big hydraulic suction dredge work.

The Columbia River bar pilots are no longer going to their duty on the schooner "Joseph Pulitzer," that staunch vessel being laid up for the winter. The pilots will use the tugs "Wallula" and "Oneonta."

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"Our Maritime Bugaboo"

The Saturday Evening Post of September 25, 1915, contains an article entitled "Our Maritime Bugaboo" by Peter B. Kyne. This same Peter B. Kyne is a short-story writer of considerable and well deserved fame, but when it comes to writing a critical essay of this kind he is exceedingly boring, having tackled the Seamen's Act as if it were a catalogue of slop chest goods. Fortunately the reader who has the least glimmering of sea conditions and of the long fights in Congress and in Congressional Committees that preceded the passage of the Seaman's Act does not have to venture very far along Mr. Kyne's argument when the cat is let out of the bag in the following paragraph:

"I make the statement now that, with the exception of the owners operating transpacific lines, no shipowner who flies the American flag has any legitimate kick coming on the effects of this bill. Any shipowner who employs white labor need not go out of business. In the first place, it does not affect Great Lakes or coastwise shipping a particle, except to make the ships safer to travel on; and a lot of small fry are yelling murder because they are forced to invest in life-boats, life-rafts and life-preservers. Dismiss that. Any new proposition that spells expense is always an outrage, because 'it never had to be done before.' People forget that the world wags on and that we are being educated right along."

We need not go any further in Mr. Kyne's article than this. In one short paragraph he has not only revealed his viewpoint of the entire subject, but he has also clearly proven that he knows absolutely nothing about the Seamen's Act and that he has "just finished reading ten pounds of weighty information" in vain.

In the first place where does Mr. Kyne obtain his knowledge or authority when he says that the act will have no effect whatever on coastwise shipping? Here, indeed, he has outceasared Caesar, for even Mr. Andrew Furuseth has never made any such ridiculous claim. Again it would appear that Mr. Kyne has never heard of the London Convention on Safety of Life at Sea which Mr. Furuseth attended as a delegate, found himself among men who knew shipping from keel to truck and being unable to foist his pet schemes upon them quit in a huff and came home, and when he was preparing his Seamen's Act in conjunction with Senator La Follette he "lifted" the life-boat findings of the London Convention bodily and placed it in his pet Act without giving credit for it. Also Mr. Kyne should know that the United States Government was in honor bound to enact the measures provided for in the London Conference and that the shipping interests knew that these measures would appear in some Smith, Brown or Jones bill if they did not appear in the Seamen's Act. Now, aside from the clauses that have been cribbed from the London Conference, we defy Mr. Kyne or Mr. Furuseth to point out one single phrase or even word in the Seamen's Act that will add one iota to safety at sea. What the shipowner is objecting to are those parts of the Act which constitute the Sailors' Union as the absolute dictator of every shipping business, and not, as is claimed, the price of a few extra life-boats.

As we mentioned before, Mr. Kyne is a writer of short stories and a good one. One of his specialties is stories of the sea. His information and much of his material is gleaned along the San Francisco waterfront and the San Francisco waterfront is more strongly unionized than any spot on earth,—the inference is obvious. Is Mr. Kyne guilty of misrepresentation in his Saturday Evening Post article? Most decidedly he is not. Pete Kyne is altogether too decent a fellow to misrepresent anything; in this case he simply just don't know what he is talking about—that's all.

In the second part of Mr. Kyne's article, appearing in the Saturday Evening Post of October 2nd and hidden carefully away in the rear of that number, a somewhat different attitude towards the Seamen's Act is assumed. Mr. Kyne admits that under the provisions of the Seamen's Act that no American vessel could successfully compete with a Japanese steamer, but in an imaginary conversation between Captain Robert Dollar and Mr. Andrew Furuseth, he leaves the latter on the victorious end of the argument. Mr. Furuseth claims that the leaven of human nature works as strongly in the Japanese as in any other race of people and that the Jap sailor will not continue to work at Japanese wages. If Mr. Furuseth persuades the Japanese sailor to desert at San Francisco and thus compels the Japanese master to sign on a Japanese crew at American wages, notwithstanding the fact that the Japanese master would discharge his crew at a Japanese port and return to America with a crew signed on at the original low rate of wages, this continual dumping of high paid Japanese crews would quickly have the effect of spreading dissatisfaction among the Japanese sailors and a rapid rise in wages would result. This, says Mr. Furuseth, is human nature and, according to Mr. Kyne, he is to send a long night message to Washington admitting his mistake if things do not turn out as he has predicted.

As far as this sort of argument goes it fills the bill but, unfortunately for Mr. Furuseth and his plans, the Japanese sailor is not the only citizen of that wide-awake Island Empire who is possessed of human nature. This human nature which Mr. Furuseth pins his faith to is a commodity

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that is pretty generally distributed and the Japanese shipowner has not been overlooked in the distribution. If we follow the imaginary conversation of Captain Dollar and Andrew Furuseth just one step further we will find that Mr. Furuseth would be completely stumped. After the Japanese master's crew has deserted and he is compelled to sign on another or the same Japanese crew at American wages, he would proceed to some Japanese port and discharge his crew, but he would not pay them American wages. He would pay them their regular wages and invite them to go into the Japanese courts and sue if they wished more and the Japanese courts certainly would not hold any contract valid that a Japanese shipmaster had been literally forced into at an American port. The result is obvious as instead of advertising the fiction that by deserting at an American port they could quadruple their wages, these Japanese sailors would spread the fact that they had tried this short cut to wealth and found that it was a dismal failure.

A SANE STATEMENT OF THE CASE.

In the Portland "Oregonian" of August 7, occurred the following interview with Herbert Satterlee:

"It is my sincere belief that the issue upon which President Wilson will be re-elected or defeated will be the position he takes with reference to the La Follette Seamen's bill.

"We are essentially an agricultural people and many of our products cannot be shipped with security unless a merchant marine be developed. Capital designated for the development of an American merchant marine has been tied with the passage of the seaman's bill. La Follette caused our chances for development in that line to be impaired when he introduced the bill into Congress, and President Wilson killed them when he signed it. And the shipping of our goods to foreign markets, especially at this time, is of vital importance. The sooner the people of the United States demand a repeal of the La Follette bill the better it will be for the entire country. And the men of Congress will not see the necessity of its repeal until the people make them see it.

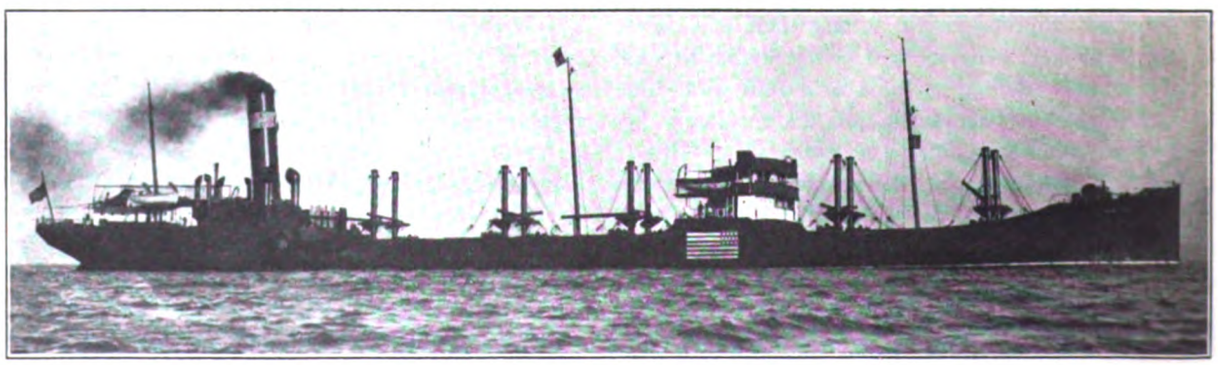
"The best way of explaining the situation in which the United States is placed with the lack of a merchant marine is with the use of a simile. Supposing the biggest department store in your town depends on transfer companies to do the delivering of its sold merchandise. Then supposing that the transfer men who are bidding for the delivery work start to fight among themselves. The result is that the department store is forgotten in the fight and left without means of geting its goods to the people. Uncle Sam is but a big business man and the United States is only a big business concern. The war has left us without means of transportation of domestic manufacturers to the ports of the world, and the Seaman's bill has killed the possibility of a merchant marine being developed.

"A campaign has been started in the East by the Chambers of Commerce for calling a special session with a view to having the La Follette bill repealed and I hope the same condition exists in the West."

When asked to give his opinion as to the stand that the labor councils have taken in their commendation of the Seaman's bill Mr. Satterlee said:

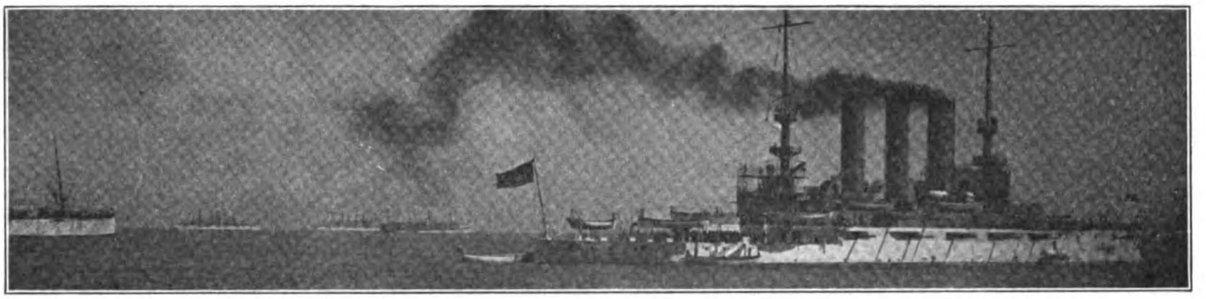
"The laborer works during the week for the paycheck that he is to receive at its close, and the farmer does his harvesting and forgets about his crop when he has received the bill of lading or the receipt for the storage of his grain. What becomes of the manufactured article or the farm products neither the laborer nor the farmer cares about after it has left his hands. But Uncle Sam has to make the delivery of the manufactured articles and the grain to ports of the world, and so it should be his concern and not the concern of labor whether the United States should have a merchant marine."

The Ballin Water Tube Boiler Company of Portland, Oregon, has secured a contract for four new boilers to be placed in the San Francisco and Portland Steamship Company's steamer "Rose City." The new boilers are to replace six Scotch marine boilers.



The "Newton," a recent visitor to San Francisco harbor. The "Newton" is fitted with Pneumercators for cargo measuring and also has DeRusset hatches. The "Newton" was in command of Captain A. G. Abbott and Mr. John R. Middleton, Assistant Engineer of the New England Coal and Coke Co., was on board watching the performance of the special apparatus.

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European Marine Notes

[From our own Correspondent.]

London, October 10, 1915.

Panama and the Coal Trade.

SOME of the newspapers here apparently are just waking up to the fact that the opening of the Panama Canal is likely to give an impetus to American competition with Great Britain in the coal bunkering and exporting business. Indeed, the price of coal is going to be one of the dominant factors in the readjustment of trade routes that will follow the opening of the Panama Canal. For example, the difference between the cost of British coal at Mediterranean stations and that of American coal at Gulf ports will in many cases decide the questions whether ships trading to the Orient and Australasia shall go via Suez or Panama, and, of course, whether they burn British or American coal. The problem seems to have attracted far more attention in the United States than in this country.

The Delay at the Panama Canal.

The obstruction in the Panama Canal is disquieting for shipowners, whose confidence in the route, as shown by new services, was being established. Lloyd's agent telegraphs that thirty-four vessels are now detained and that no date can be given for the reopening of navigation; among these vessels, owners' private messages state, are some fine British liners many miles inside the canal. Whether the ships could turn round is not clear, but, in any case, while they are detained they are burning coal and involving their owners in losses which probably represent some thousands of dollars per ship per day. Inquiries are now in the market for insurances providing for the payment of expenses for every day that ships may be detained in the canal, but obviously the present is not the most propitious moment for placing them. The whole queston of navigation through the canal is now being carefully considered by underwriters. It is only fair to say that, in spite of fairly numerous slides causing brief delays since the opening of the canal nearly thirteen months ago, casualties to ships have been few, and that British owners have come to recognize the merits of the route for certain services, especially for those between the Far East, California, and the Atlantic ports of the United States.

Pacific Liners For Atlantic Trade.

Insurances against marine risks were on September 1st completed in the London market on five large passenger liners which the International Mercantile Marine Company has bought from the Pacific Mail Steamship Company. The liners have hitherto been employed in the transpacific trade, but have been withdrawn owing to the provisions of the National Seamen's Act, which would make competition with Oriental lines unprofitable. It is believed that the two largest vessels—the "Manchuria" and "Mongolia," each of which is nearly 13,700 tons—will probably be employed in the North Alantic passenger trade, but that possibly two smaller vessels—the "Korea" and "Siberia"—will, like the American liners "Kroonland" and "Finland," be employed in the service between New York and San Francisco through the Panama Canal. The four ships now transferred have been among the largest in the transpacific trade and each has a large amount of passenger accommodation. The "Manchuria" and "Mongolia," which were both built in 1904, are valued at about $1,500,000 each. Their speed is 16 knots. The "Korea" and "Siberia" are sister ships of 11,300 tons, built in 1901, and steam 18 knots. Each is valued at about $1,100,000. A fifth vessel which has been bought is the "China," of 5,000 tons, built in 1889, and having a speed of 17 knots. She is valued at about $375,000, so that the value placed on the five ships is well over $5,000,000. It is understood that the liners will continue to fly the United States flag and are being insured against war risks with the United States Government.

High Prices For Shipping.

The high values now placed on shipping property have been shown very plainly at the public sales of steamers held in London last week. The prize steamer "Emil," of 2,991 tons, built at Newcastle in 1904, was sold on September 7th for $291,500, which represents more than $95 per gross ton. Just two years ago she was sold by a British firm to her

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late German owners for $140,000, so that within two years the value has doubled. On September 9th the Danish steamer "Lucy Anderson," of 1,052 tons, built at Newscastle in 1904, was sold to a British buyer for $132,000, or as much as $125 per gross ton. The price of $181,000 at which the prize steamer "Hans Woermann," a cargo and passenger vessel of 4,059 tons, built at Port Glasgow in 1900, was sold, seems reasonable enough, but no one could really form a fair estimate of the value of any passenger steamer without first carefully inspecting her. A cargo steamer, on the other hand, may be valued fairly accurately on the strength merely of statistics. The prices paid now are high, but no doubt buyers see their way clear to working the ships at a profit. It is even estimated that buyers of prize steamers at the beginning of the year could by now have recouped themselves by the freights for the capital cost of the steamers, and could to-day sell the vessels at prices very far in excess of what they paid for them. All the prices now paid seem to be based on the assumption that the vessels will be able to take advantage of the high market rates, and will not be requisitioned for Government service.

The Wind-Jammer's Return.

One result of the sinking of so many steamships has been to bring back to the sea many of the old sailing ships. It was thought that the opening of the Panama Canal had given the death-blow to the wind-jammer. Many sailing ships have been captured from the Germans and sold to British and neutral firms, and are now employed in carrying foodstuffs to this country. Some have been sold at the Baltic at extraordinary prices. These slow boats, dependent as they are on favorable winds, are an easy prey for the submarines, and many seafaring men think that they should be assisted to reach port when the weather is adverse by the provision of free towage within the danger area.

Anglo-Japanese Shipping Rivalry.

For some time a keen struggle has been in progress between British and Japanese steamship lines for the capture of maritime trade in far eastern waters formerly carried on by Austrian and German companies. In consequence, however, of so much tonnage having been requisitioned by our Government for war purposes the British concerns are just now at a disadvantage. The consolidation of the Holt interests, however, by the acquisition of the Indra line, the institution of sailings by the British India Company between Singapore and Bangkok, with a connection at the former port with the outward and homeward Peninsular and Oriental mail boats, will strengthen our position. At the moment the Japanese are giving special attention to the trade of the South Seas and of the Pacific, while one company, the Osaka Shosen Kaisha, is about to start a regular service to Europe, and it is understood that in all likelihood Manchester will be one of the ports of call. So far, however, the competition has not been unfriendly, and, in fact, acting upon the advice of the Foreign Office in Tokio, the Japanese companies, in accordance with the trading with the enemy (China, Siam, Persia, and Morocco) proclamation, 1915, are now refusing to load German cargoes. I also learn that the branch establishments of the Hamburg-Amerika line and the Norddeutscher Lloyd in British far eastern territory are gradually being wound up, and indeed many of their lighters have already been bought by various port authorities there.

British Shipping Earnings and Taxation.

Since shipping is admittedly one of the industries which have done well during the past twelve months, the possibility of some special war taxation in the forthcoming budget has not been overlooked by owners. While they as a class seem fully prepared to bear their share of the financial burden, it is just as well that some of the complications involved in the taxation of war profits should be generally recognized. In the first place, as the shipping expert of the London daily "Times" points out, the highest freights have been earned by neutrals, who, unlike British owners, have been under no restrictions as to routes and have not had their vessels requisitioned by their respective Governments. If, therefore, British owners were deprived of a large proportion of their earnings while neutral owners retained all theirs, the latter would be in a far stronger financial position than the British lines after the war and could afford to spend much more money in competition. The largest German shipping lines were in the habit of allocating handsome sums every year to their "fighting funds," though, as it has happened, these funds have probably been employed during the last thirteen months in paying the heavy bills incurred by liners while lying up in neutral ports earnings nothing.

Undoubtedly, if circumstances perimtted, much of the money now being earned would be employed in



150-ton floating crane placing a Diesel engine in a vessel.

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building new tonnage. But since builders, as a rule, can give no guarantee of date of delivery, owners naturally hesitate to place orders at the very high prices that would now be asked. As soon, however, as delivery can be guaranteed and prices fall there will be a flood of orders. The importance of a large mercantile marine to this country has never been more apparent to anyone than now, while if the great German liners at present lie useless in port their managers hope to put them into service after the war and to see them competing again with British ships. In past years British owners were repeatedly charged with unwisely investing all their surplus earnings in new vessels to the general depreciation of tonnage. The advantage which that policly has given to this country in time of war is not even yet fully appreciated by everyone. Certainly never before has there been such justification for investing profits in new tonnage the moment the shipyards can undertake the work.

One of the most interesting developments in marine engineering is that of internal combustion engines. At Messrs. Swan, Hunter and Wigham Richardson's Nepture Engine Works they have been studying this matter for some time and have evolved their well-known Nepture-Diesel marine oil engine. I send you herewith a photograph showing a set of these engines being lifted into a ship by their 150-ton floating crane. The engines look peculiarly small, which of course is one of the advantages of an internal combustion engine when compared with the old type of reciprocating steam engine. The photo I send gives a very good view of their floating crane which is an extremely useful part of their shipyard equipment. This floating crane of Swan, Hunter and Wigham Richardson is frequently lent on hire to neighboring firms for lifting heavy machinery, boilers, armor plate, guns, barbettes, etc. It is also used for harbor work such as drawing piles and laying concrete blocks.

The Coming Shipping Investigation

THE letters given below are highly interesting and would seem to indicate that all firms engaged in shipping, whether it be exporting or importing and whether the present abnormal freight conditions have affected them adversely or not, will not lend themselves to the Government's scheme of so discrediting regular water carriers in the eyes of the public that the Administration's Ship Purchase bill will not again meet with such strenuous opposition.

Department of Commerce.
Washington, Sept. 21, 1915.

Dear Sirs:

The Department of Commerce is investigating prevalent conditions created by the European war, affecting adversely the movement of foreign commerce.

Your activities indicate that you are directly interested in this subject, and it will be helpful if you will submit to the Department supporting details of all instances where your efforts to secure ocean freight room for import or export traffic have been hampered and the causes thereof.

Cases where shipments have been refused ocean space, or where the sale thereof was prevented by the imposition of increased ocean freight charges, or onerous shipping requirements, are particularly desired; the names and addresses of buyer and seller, copies of pertinent correspondence exchanged between them and the steamship agents directly connected therewith, and copies of ocean contracts ultimately made, is the character of data desired.

Such information will be treated in confidence and will not be made public without the assent of those furnishing it.

It is hoped you will avail of this invitation to assist in thus materially advancing the work of this investigation. Respectfully,

WILLIAM C. REDFIELD,
Secretary.

There are always two sides to a question but from the contents of this circular letter it would appear that our Government considers that it is prosecuting a criminal case and wants evidence tending to one conclusion only. Below we print a typical reply or, to be more explicit, a typical rebuke of the Government's methods of obtaining "evidence":

Sept. 25th, 1915.

Hon. Wm. C. Redfield, Secy.,
Department of Commerce,
Washington, D. C.

Dear Sir:

You are quite right in the assumption that we are interested in the movement of foreign commerce and in the conditions long existing, which have become more evident by virtue of the European war.

We have no doubt that there will be investigations, and more investigations, and then about three years after the need for action has come and gone in large part, there will be a voluminous report rendered to Congress. We are truly great on investigation and talk, but our inaction has become a world joke. We talk about banks and credit arrangements with South America yet while we talk the warring nations of Europe with all they

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have to think and plan for, are making better and faster plans to take away what little gain we have made in South America and other parts of the world.

We have talked for twenty years about helping the American merchant marine yet what kind of help has it received in recent months? Congress has indulged in such monumentally stupid legislation as the so-called "Seamen's bill." Not satisfied with that, it is proposed that the Government shall go into the vessel-owning and operating business in competition with its citizens. This is another piece of rank injustice and in line with the policy of the Government whereby the Government has employed foreign ships to carry its coal in the coastwise trade between American ports. The Government has done what it prohibits its citizens from doing; has done these acts to save a few dollars in times of peace, and without the exigency of war. It has virtually broken its own laws. Is it any wonder that American capital hesitates to invest in vessel ownership and operation?

In the face of a great emergency and a far greater opportunity, why did this Government stop to experiment and fool with the theories of Furuseth and La Follette who evidently want this country to be the club with which they seek to "beat up" the established order of things throughout the maritime world? This country has seen fit to swallow English law for the basis of its laws in most matters civil and criminal, why then would it not have been the act of common sense for us to have adopted as a whole the English laws and regulations as applied to vessels engaged in foreign trade? It certainly stands to reason that a nation with a vast experience, down to the minute, and controlling two-thirds of the commerce of the seas, should have devised laws that would at least answer our needs for the time being. It would be time enough for us to "improve" those laws after we secured sufficient experience in the foreign trade to justify us in the attempt.

We are interested in an American ship now engaged in foreign trade. Suppose that ship is held up several times on the high seas for examination of ship's papers, and possibly her cargo as well; supposing further that she loses several days' time by these interruptions that are enforced upon her for the sole and only convenience and satisfaction of the aggressor, will the United States Government undertake to collect from the offending Government a reasonable and proper demurrage in satisfaction of the loss sustained by the owners? This Government may have conceded the right to foreign nations to stop our ships on the high seas but has it agreed that its citizens shall have no protection against the losses sustained? Where is the American spirit of 1812?

If this Government wants to build up a foreign trade and really desires to secure an American merchant marine, it can be done. We make the following suggestions:

1st. Let American capital purchase ships wherever they can be bought on the most favorable terms, either at home or in foreign markets.

2nd. Let the owners man these ships with the same men that have been in charge of them previously and who have complied with the requirements of other first-class nations in gaining certificates of competency. Allow this privilege for at least five years.

3rd. Adopt in total the English laws and regulations that pertain to equipment and inspection.

4th. Assist American owners to obtain sufficient insurance in all of its branches by co-operation with American underwriters.

5th. Give American owners substantial assurance that ships under the American flag will have adequate protection throughout the world.

6th (and very important). Let it be kept in mind that the labor unions and allied organizations are not the ones that produce the capital for investments in ships; that if Americans are to be induced to invest their money in the ownership of vessels, and be held responsible for their successful operation, they must have a few of the rights guaranteed by the Constitution of the United States.

As regards the coastwise trade we have no objection to retaining this for American-built ships. They cost so much more than foreign-built vessels that they would be completely outclassed in foreign trade competition under normal conditions. They would have to start with a handicap that could never be overcome. If the coastwise trade is reserved to American-built ships our owners can afford to patronize American shipyards.

The New London Ship and Engine Company has been quite busy during the past few weeks with commercial work as well as with the large amount of naval work on hand. Among the latest orders placed with this firm are two 60 horse-power, four-cylinder engines for an oil delivery boat for use in the Gulf of Mexico coasting trade, a 120 horse-power engine for use in a Maine coast cannery tender and another 120 horse-power engine for a fishing boat working out of Gloucester.

The Fore River Shipbuilding Corporation has three 6000- and two 5000-ton steamers under way in addition to four torpedo-boat destroyers, twenty submarines and one dreadnaught.

Bids will be opened November 17 for the two new United States battleships. The new craft will be 624 by 97 by 30 in dimensions, of 32,000 tons displacement and the appropriation is $7,800,000 each.

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Charles Dunann, passenger traffic manager of the Pacific Coast Steamship Company.

CHARLES DUNANN.

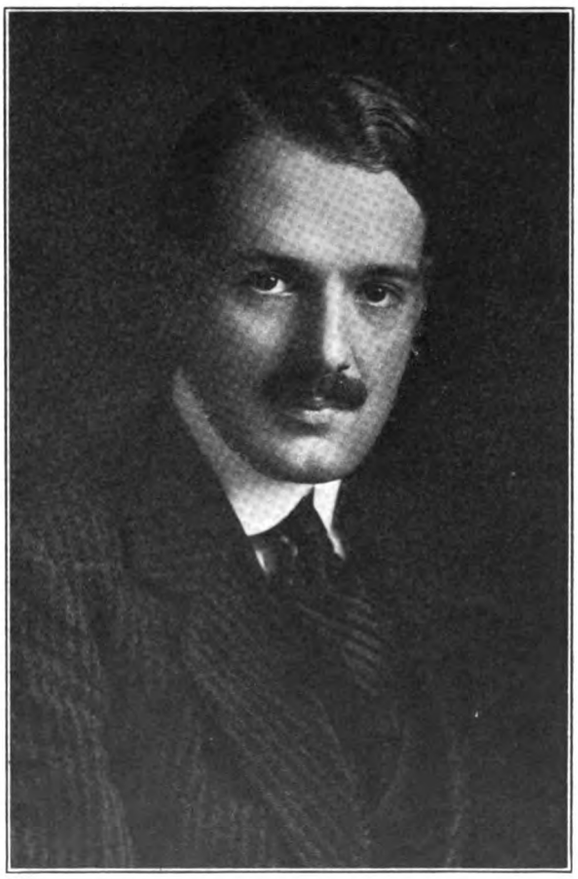
Perhaps no general passenger agent or traffic manager in the steamship business is better known on the Pacific Coast than Charlie Dunann of the Pacific Coast Steamship Company, and his place in the estimation of his confreres and the traveling public has been earned since 1902, when he came to San Francisco with J. D. Farrell to act as general passenger agent for the steamship company. Up to this time Mr. Dunann's career had followed the lines of railroading and telegraphy. Taking up telegraphy in 1874 with the Baltimore & Ohio Railroad he was made manager of the Fort Wayne branch of the American Telegraph Company in 1876. Getting into the ticket agent field he rose rapidly during his connection with the following lines: The Pennsylvania, Nickel Plate, Wisconsin Central, Minnesota & Northwestern, with which latter company he remained for fourteen years as city passenger and ticket agent in Chicago. It was this position which Mr. Dunann left to take charge of the passenger service of the Pacific Coast Steamship Company, where he enjoys the implicit trust of the management and is allowed a wide latitude of authority over all passenger traffic matters. In the Alaska excursion business, Mr. Dunann was a pioneer and his success in popularizing the Alaska trip with the traveling public has led to his being known to many friends as "Totem Pole Charlie."

S. H. VAN GEUNS.

With the opening of the Panama Canal it was confidently predicted that Europe and the West Coast of North America would be more closely connected through the services of several of the great steamship lines. The outbreak of war naturally detained the fulfillment of these hopes of western shippers, but in one respect at least the west coast seaports are becoming better equipped to take full advantage of such connections. We refer to the number of shipping men from the older countries who have taken up residence among us.

Among the younger men who have been prominently mentioned as well fitted to further the interests of any West Coast-European connection is Mr. van Geuns. As was natural for a Hollander, Mr. van Geuns had an early training in the steamship business. Entering the employ of a large shipping firm at the age of eighteen, he was in charge of a department inside of two years. Coming to San Francisco as the head of S. H. van Geuns & Company he succeeded in rapidly building up a large business to Scandinavian ports.

When the cessation of hostilities in Europe makes it possible for the many lines now either interned, disrupted through the temptation of high freights or crippled through government



S. H. van Geuns.

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requisition for transport services, to once more resume their plans for the use of the new international trade routes, the presence of Mr. van Geuns will be of material benefit to any transportation company which he may happen to represent, as he combines a thorough knowledge of European commercial conditions and a wide circle of influential connections with a keen insight into business practices on the Pacific Coast.



E. F. DeGrandpre, Assistant to the President, Pacific Coast Steamship Company.

E. F. DeGRANDPRE.

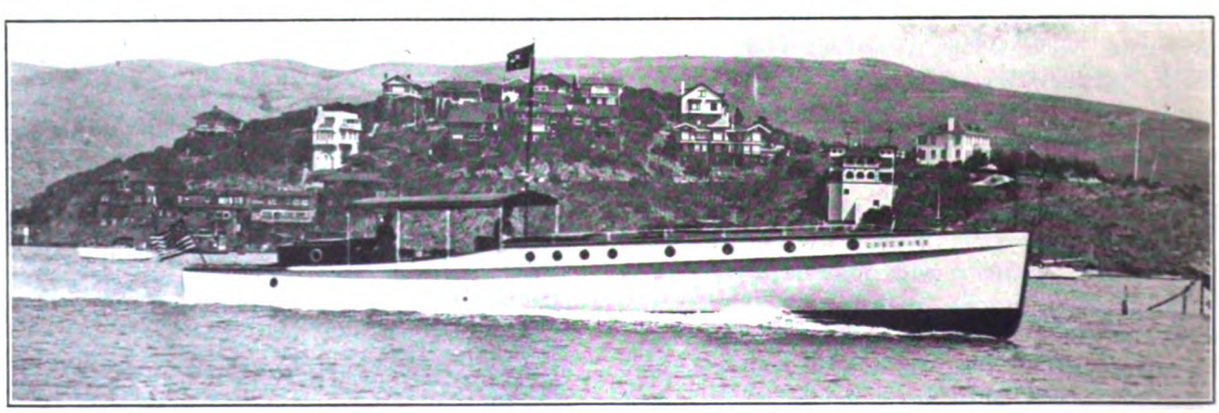
Among the men who have come rapidly to the front in the management of floating property on the Pacific Coast few are better known than Mr. E. F. DeGrandpre. After several years of business training with the railroads and commercial houses of the Northwest, Mr. De Grandpre entered the employ of the San Francisco and Portland and Portland and Asiatic Steamship Companies at Portland, when the operation of these Harriman water lines was divorced from the operation of the rail lines in 1904—beginning as a stenographer and advancing successively to the positions of ticket agent, city passenger agent, soliciting freight agent and traveling freight and passenger agent. He left this service in 1908 to accept the freight and passenger agency of the Pacific Coast Steamship Company at Portland, coming to Seattle for the same company in 1909 as contracting freight agent and entering the President's office on January 1, 1911, as Chief Clerk. On the first of January, 1914, Mr. DeGrandpre was promoted to be Assistant to the General Manager of the Pacific Coast Company and Assistant to the President of the Pacific Coast Steamship Company.

The latest survey of the Columbia River bar shows a depth of 36 feet at zero stage for a width of 1000 feet, an increase of 4 feet since the survey in April. Excellent results are also being obtained on Coos Bay bar, a depth of 30 feet for 600 feet in width now being reported as against 18 feet last May.

On or about March 15, 1916, the light at Piedras Blancas Light Station, in Latitude 35-39-57 North, Longitude 121-17-01 West, will be changed from fixed and flashing white to group flashing white, showing a group of 2 flashes every 15 seconds.

COMMISSIONER OF LIGHTHOUSES.

The illustration below represents the "Gosumore," the fastest and one of the most successful express cruising motor boats on the Pacific Coast. This handsome 62-footer is the property of Commodore C. H. Crocker. She is engined with two 5½" by 6" six-cylinder Van Blerck motors capable of delivering 260 horse-power and is always ready for a speed of twenty-five and one-half miles an hour. The local representative of the Van Blerck motor is G. M. Josselyn & Company.



The "Gosumore," Commodore Crocker's fast express cruiser.

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Freight Report

By PAGE BROTHERS.

October 20th, 1915.

Our last review, dated 20th of September, noted a lower level of freights in all the chartering markets. As explained, this was due to the fall in exchange, as well as to the fact that it was the period between crops, but we said then, that freights would be higher, and in greater demand, and such is the case, freights having advanced materially, especially on our Coast to United Kingdom, and also on the New York side, and the marked advance having taken place besides, in Buenos Aires, and on the West Coast of South America for nitrate.

From San Francisco, we have no new charters to report. The principal business in the exporting of grain has been done with the regular liners, on a basis of from 85/- up to 90/- for London direct by the steamers "Korea" and "Siberia," and from 90/- up to 100/- for Scandinavia by the East Asiatic steamers. Of course, for canned goods and general merchandise, fully 10/- to 15/- more has been paid.

From the North, rates were advanced from 92/6 by M. H. Houser taking the steamers "St. Dunstan" at 95/-, and "Harewood" and "Margan Abbey" at 97/6 for the West Coast of U. K., and 100/- East Coast of the same.

Owing to the stoppage of the Panama Canal, freights from this side have advanced still more, as shippers realize that the avenue for steamers to make a short run to this Coast, is now indefinitely closed, probably until about the first of January at least, and to-day, 105/- is vainly bid for steamers for wheat from Portland to U. K.

Quite a business has been done in sailers, Hind, Rolph & Co. having chartered the "Inveresk" at 80/-, and M. H. Houser the "Invergarry" at the same price, Strauss & Co. the "Dieppendale" and the "Alice A. Leigh" and the "Celticburn," at rates ranging from 80/- to 85/-. The "Hougomont" has been chartered, on private terms, by one of our shippers whom we cannot name. M. H. Houser chartered the "Holt Hill" at 90/- January arrival, and 85/- February arrival, and the Portland Flouring Mills have taken two of Hind, Rolph & Co.'s original charters, named "Rene" and "Langdale," on which there is, no doubt, a profit of at least 10/-. The steamer "Valetta" was the last charter drawn from Portland, taken by Dewar & Webb of London, at 100/-.

Steamers on time charter still remain firm, and the tonnage available is principally Japanese. Frank Waterhouse & Co. chartered steamers "Koan Maru" and "Kaifuku Maru" on round charters, delivery and redelivery Japan, at about 11/- on the dead weight, and the American steamer "Rio Pasig" chartered for delivery and redelivery Japan, one round to this Coast, at 11/- by Norton Harrison, Manila. Comyn, Mackall & Co. have made a Time Charter on the "Tokai Maru," delivery New York, redelivery Japan, for about eight months time, at 16/- on the dead weight. The same firm has chartered steamer "Nisei Maru" for delivery and redelivery Japan, Pacific Ocean trading, for one year, at 11/6. Steamer "Tampico" has been chartered by Sudden & Christenson to take place of the "Eureka," which is on the other side of the Canal, on private terms.

Lumber freights are very steady, and temporary weakness (caused by some Japanese steamers coming into the market in the dull period a month ago) has entirely vanished, due to the present activity and demand for steamers. The Mohns Commercial Co. chartered the "Ottilie Fjord" from the North Pacific to a direct port in Peru at 90/-, and the "Honoipu" from North Pacific to Callao at $20.00 per thousand. A. F. Thane & Co. rechartered the Barkentine "Alta" from J. J. Moore & Co. at 95/- for Sydney, 100/- for Melbourne, for a mixed cargo of lumber, all to be loaded in San Francisco. Hind, Rolph & Co. chartered the "Albert Meyer" at 97/6 Sydney, 107/6 Melbourne, from Eureka, also a recharter, and they also chartered the "Kona" and "Robert R. Hind" from Puget Sound to Sydney for their own account, as they own the vessels. The "C. A. Thayer," from Grays Harbor to Newcastle at 95/-, was chartered by the American Trading Co., also the "Edward R. West" from Grays Harbor to Fremantle, at private rates, presumably, about 110/- to 115/-. J. J. Moore & Co. chartered the American ship "Aryan" from San Francisco to Melbourne, mixed lumber, at 95/-, also steamer "General Y. Pesqueira," from Everett to Port Pirie on private terms, and the barkentine "S. N. Castle" from North Pacific to Port Pirie at 105/-. Pope & Talbot chartered the "Star of Holland" from Puget Sound to Port Pirie, supposed to be about 110/-. The Pacific Export Lumber Co. chartered schooner "Commerce" from North Pacific to a direct port in New Zealand, on private terms. Balfour, Guthrie & Co. chartered the schooner "Hugh Hogan," the first sailer that has gone to Shanghai for many a long day, and supposed to be on the basis of about $14.00 per thousand. Findlay, Durham & Brodie chartered schooner "William Nottingham" from British Columbia to Africa at 140/-.

For U. K., A. F. Thane & Co. chartered steamer

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"Strathbeg," delivery Norfolk, relivery U. K. This steamer brings coal from Norfolk, Va., to this port on the basis of $4.85. The British Admiralty have named to A. F. Thane & Co., for further shipment of lumber to U. K., the steamers "Rio Pirahy" and "Corfu," and the Admiralty have also named steamers "Strathendrick," "Prophet," "Riverdale" and "Sutlej," all chartered by them, against lumber bought on the Columbia River for U. K. Two of our locally owned vessels have been chartered to carry full cargoes of case oil from this port to New Zealand and Australia, namely, "John Ena" by the Standard Oil Co., and "Golden Gate" by G. W. McNear, Inc. Rates of freight are private.

Several transactions have taken place in the matter of exchange of ownership of sailers and steamers. The Charles Nelson Co. have bought schooner "Churchill" from the Simpson Lumber Co. at about $18,000.00 and it is more than probable that A. F. Thane & Co. will buy the schooner "Echo" at about the same price. G. W. McNear, Inc., have been active buyers of tonnage. Since the purchase of the "Andrew Welch," they have bought the American ship "Dirigo," and the ex-Norwegian sailer "Prinz Waldemar," now at Salina Cruz, and to be towed up here by the "Hercules," and to be rerigged and properly conditioned for a cargo to Scandinavia. The same firm have bought the steamer just built by Mayor Rolph, at $750,000.00, and the sister steamer to this, the "Eurana," has been bought by Eastern buyers at the same price. The "Kansas City" is sold for $350,000.00. It is reported that the Alaska S. S. Co. bought her, and a Chinese company have bought the steamer "China" from the International Marine on private terms.

The stoppage of the Panama Canal, though it has put wheat freights on a high basis, has been a great calamity to our merchants, as well as to our shipowners. Slides, from time to time, have naturally been expected to occur, but no one ever considered such a catastrophe (it might be called) as the absolute damming of the Canal for at least three months from the time of its happening. Therefore, serious losses have been, and are being made, on account of the extra time vessels are forced to lose going around the Straits of Magellan to fulfill their charters, and the other expenses of fuel, etc., besides, and there is a general sentiment that the U. S. Government should, in some way, up to a certain extent, make up to time charterers and shipowners, some part of their heavy loss.

The Latest in Wireless

The Federal Telegraph Company, operating the Poulsen Wireless System, has recently moved from the Merchants Exchange Building to new and commodious quarters on the eighth floor of the Hobart Building.

On making a visit to their new offices, the writer was amazed at the rapid progress that is being made in the development of Poulsen Wireless for commercial service. The latest improvement is the "Duplex" which enables them to give the rapid service so much appreciated by business men on the coast. From an antenna strung from the top of the Hobart Building to the top of the Flatiron Building, messages are received by the operator in the Hobart Building. These messages are copied on a typewriter and are ready for immediate delivery. At the same table sits another operator who is sending messages through the powerful station located on the beach at 48th avenue. These messages are received direct at the downtown office in Los Angeles, thereby giving the most rapid service possible by any telegraph system.

Formerly it was the custom of all wireless companies to receive messages at their stations, the character of the signals making it necessary to copy the messages by hand. They were then relayed by a wire line to the city office for delivery.

Another recent improvement makes it possible for the operators in the city office, located on the first floor of the Hobart Building, to send two messages simultaneously from the powerful station located at South San Francisco; one of them directly to Honolulu and the other to Portland.

An antenna is being erected on the roof of the Board of Trade Building in Portland, which, together with a station located at Lents, will give a complete wireless duplex service between San Francisco and Portland, thereby greatly increasing their speed and capacity in the handling of business for northern coast points.

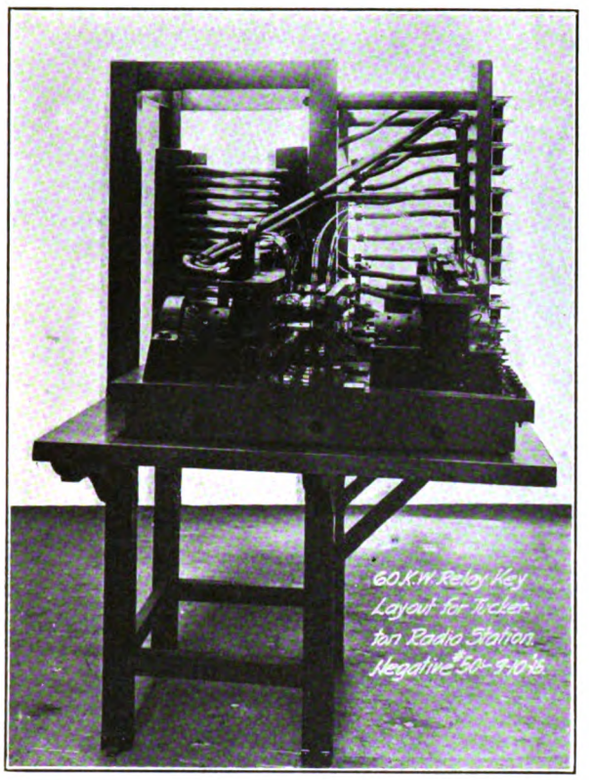
Patrons of the Federal who are interested in wireless and the rapid development of that company, are cordially welcomed at their offices where great pleasure is taken in showing visitors how their business is received and transmitted.

Accompanying this article are cuts showing some of the improved apparatus which is manufactured at their factory in Palo Alto.

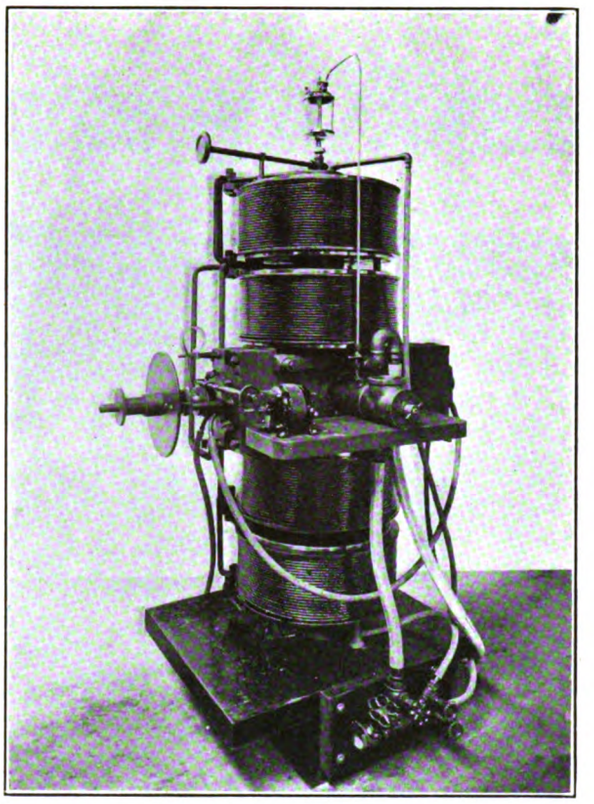
The photograph of the 15 kw. arcs shows a portion of the apparatus which is being manufactured for the Government for installation on the flagships and battleships of the U. S. Navy.

The next cut is a photograph of a 60 kw. arc

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60 K. W. relay key for Tuckerton radio station.



A recently developed relay key.

installed on September 25th in the German station at Tuckerton, New Jersey, now being operated by the Navy Department of the United States. This is the apparatus that enables the United States to keep in constant touch with Germany by exchanging messages with a station located on the outskirts of Berlin. Both press dispatches and commercial messages are handled. This provides the only reliable means of communication between the United States and Germany, the British Government having cut all cables when war was declared.

The last cut is a photograph of the relay key recently developed which makes possible the transmission of commercial signals between Tuckerton and Berlin, a distance of 4,000 miles.

The Poulsen System is conceded by all authorities to be the best system of wireless telegraphy in existence, both in theory and development, and a visit to their office quickly explains the reason for their rapid growth in popular favor with the telegraphing public.

It is expected that the question of issuing bonds to cover the construction of a belt line railway along Whatcom and Railroad avenues and other Seattle waterfront streets will be voted upon by the citizens of Seattle this December.



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INDIANA BENDING OAK - TEAK - ASH
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THE LARGEST STOCK OF HARDWOODS IN THE WEST

WYBROLITE WATERPROOF VENEER PANELS

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A set of 15 K. W. arcs, U. S. Navy type.

CRUDE OIL BURNERS MECHANICAL TYPE

A. H. Light, Superintending Engineer for the Marine and High Pressure Department of the American Standard Oil Burner Company's plant, Seventh and Cedar streets, Oakland, has perfected and patented a very clever "Safety First" mechanical atomizer.

A number of serious accidents have occurred on ships using mechanical atomizers due to firemen failing to replace tips when changing, or from stripped threads. The "Light" atomizer has a steel ball which closes the rotation chamber to tip when in operation, and which closes oil line should tip accidentally be left out or tip casing threads be stripped, as shown by the following illustrations.



The American Standard Oil Burner Company (successor to the American Heat and Power Company) have been manufacturing mechanical crude oil burners for a number of years, and the Simplex Standard Rotary and Simplex Junior Horizontal Rotary are well known to the heating trade. They have lately added to their large plant the Simplex-Light system for marine and stationary boilers, manufacturing and installing "Safety First" mechanical atomizers, working under from 150 to 175 pounds pressure, improved design, delivering a perfectly atomized cone of oil.

Mr. Light, who has charge of the Marine Department, has had a very wide practical experience

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF AUGUST 24, 1912,

of Pacific Marine Review, published monthly at San Francisco, Cal., for October 1, 1915.

Name of— Postoffice Address.

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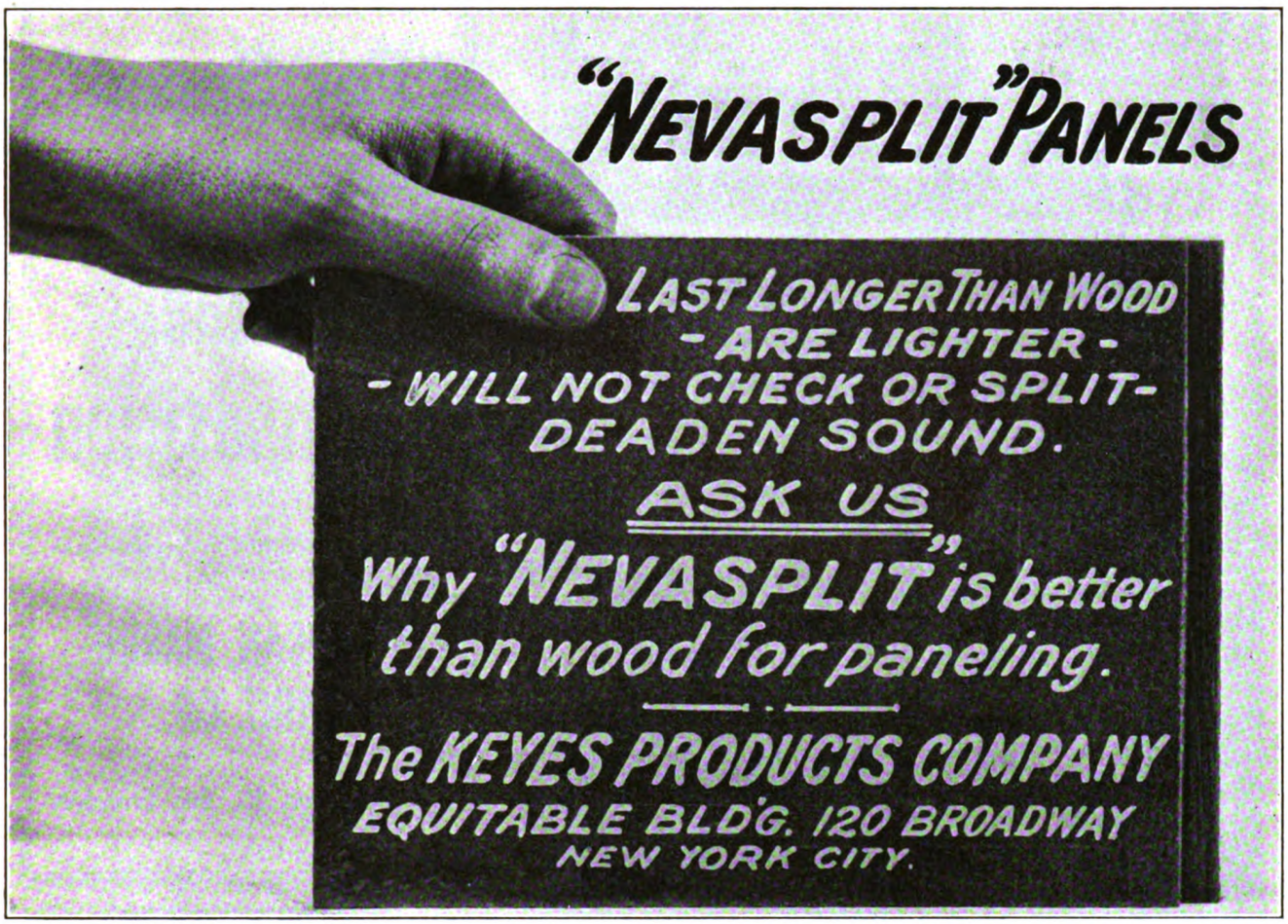
J. S. HINES, Publisher.

Sworn to and subscribed before me this 1st day of October, 1915.

[Seal] LINCOLN SONNTAG,
Notary Public in and for the City and County of San Francisco, Calif.

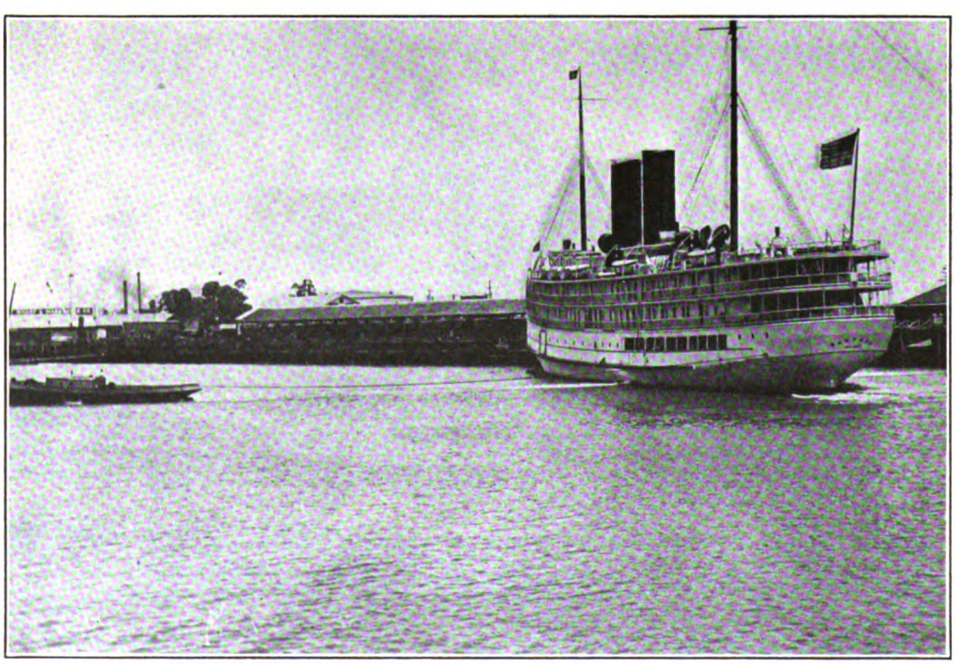
(My commission expires December 20, 1917.)

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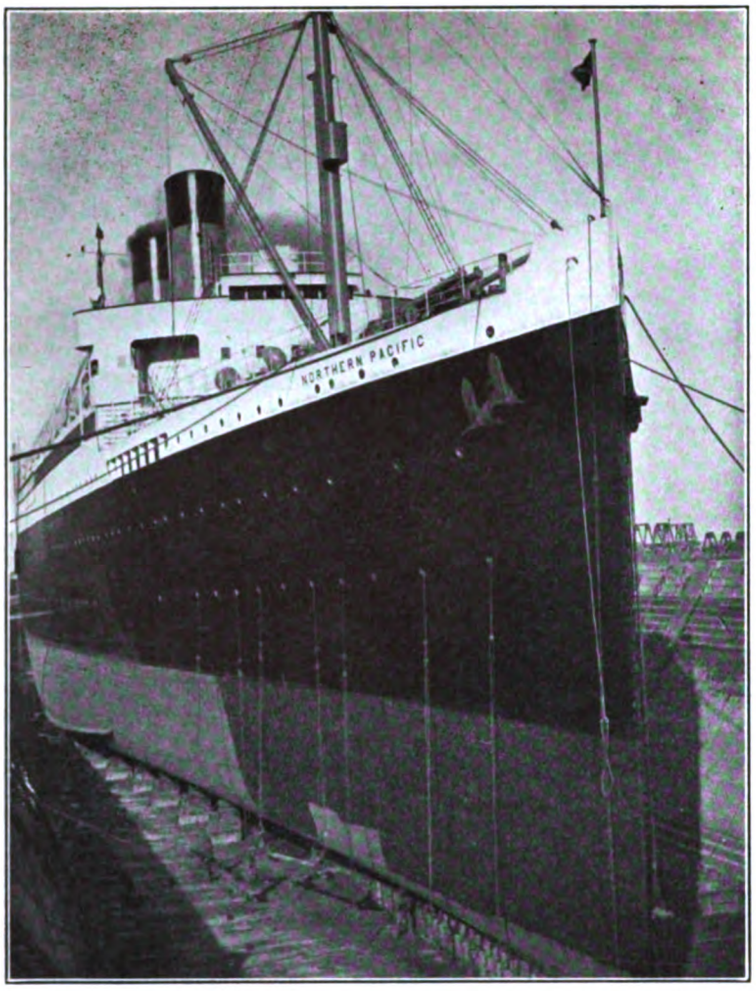
in this line of work, having spent the past nine years in the study of boiler and furnace efficiency and the mechanical atomization of crude oil fuel; designed and installed the equipment of numerous plants, and has observed and given expert advice on many oil burning steamships on the Pacific. The slogan of this company in entering the marine field is that quality pays and that the very best in mechanical construction will meet with the favor of shipowners and shipbuilders.

The accompanying photograph shows the gasoline tug "Listo" towing the steamer "Harvard" at San Pedro. This docking and line handling business was formerly attended to by a large steam tug. The "Listo" is 63 feet over all, 13 feet beam and 7 feet draft. She is fitted with a 125 h.p. three cylinder Union engine of the open crosshead type. She is owned by the Wilmington Transportation Company of San Pedro, which has recently built a duplicate boat named the "Vivo." The "Listo" was the first gasoline tug to enter the San Pedro harbor towing field and in addition to turning large steamers she is kept busy towing lumber schooners in and out of the harbor.



Gasoline tug "Listo" turning the steamer "Harvard" at San Pedro.

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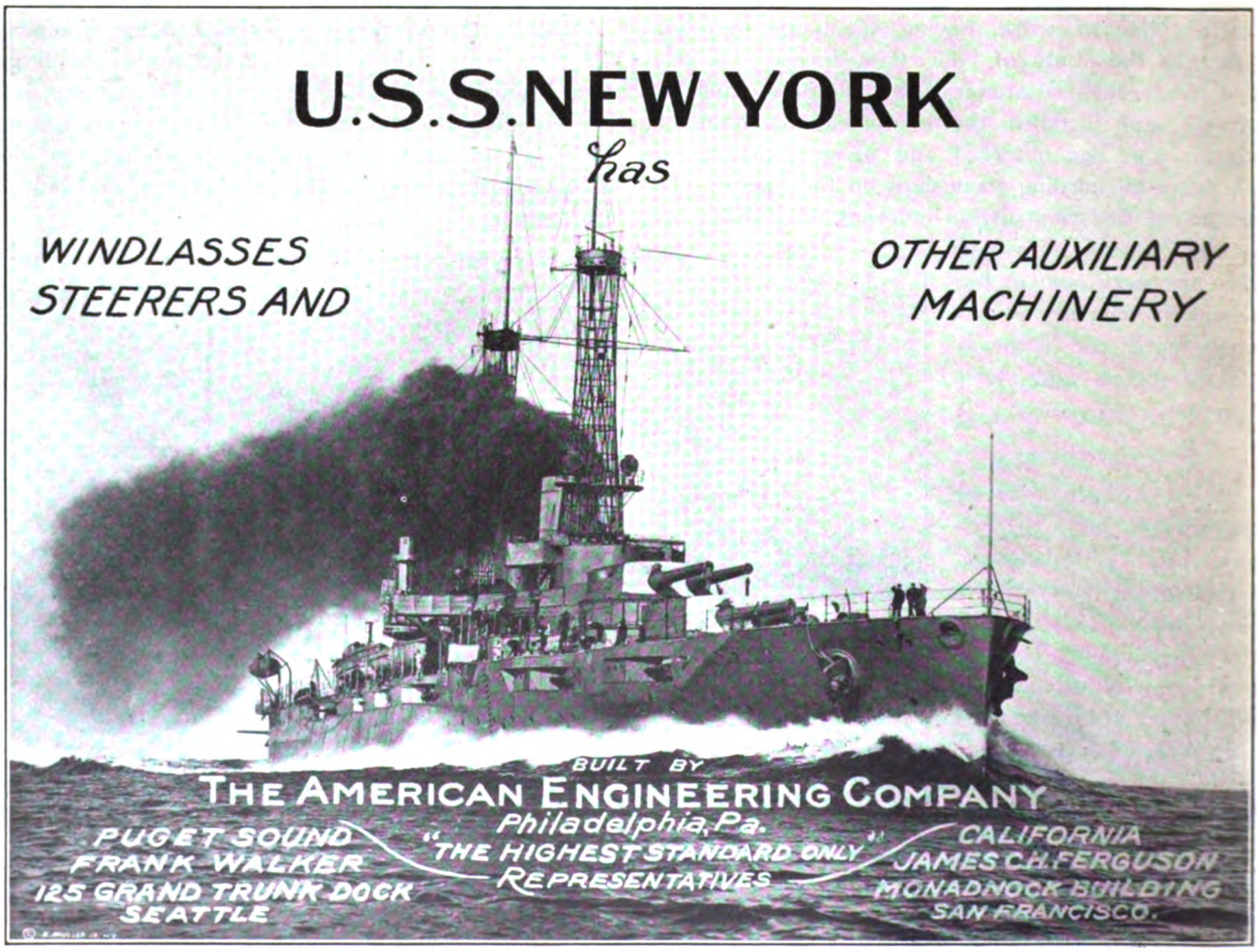
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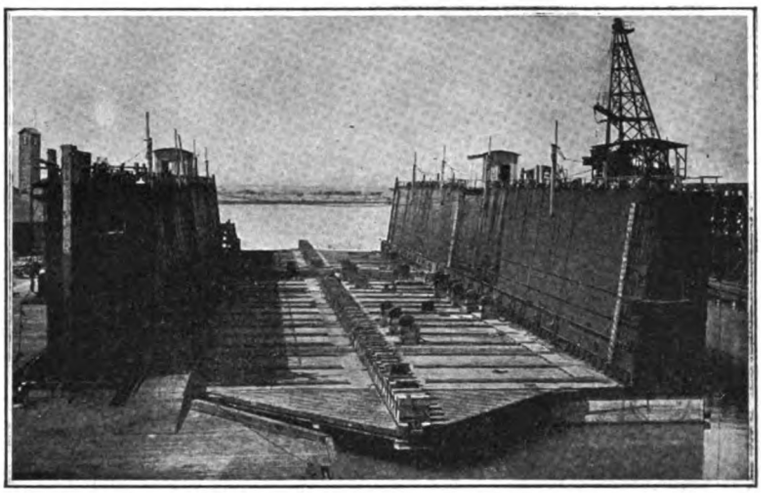


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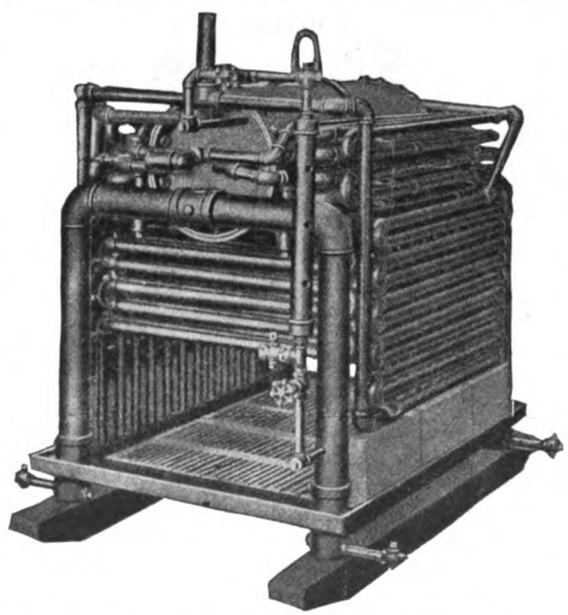
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Seattle Construction and Drydock Company

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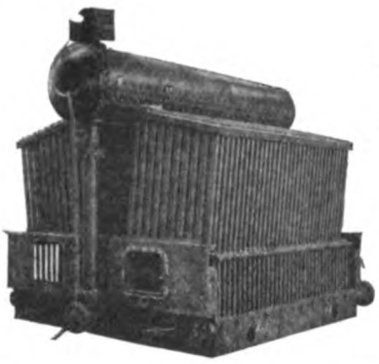
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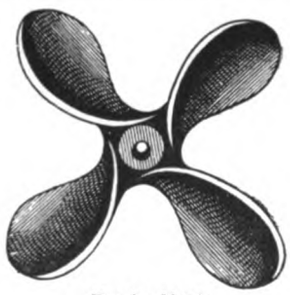
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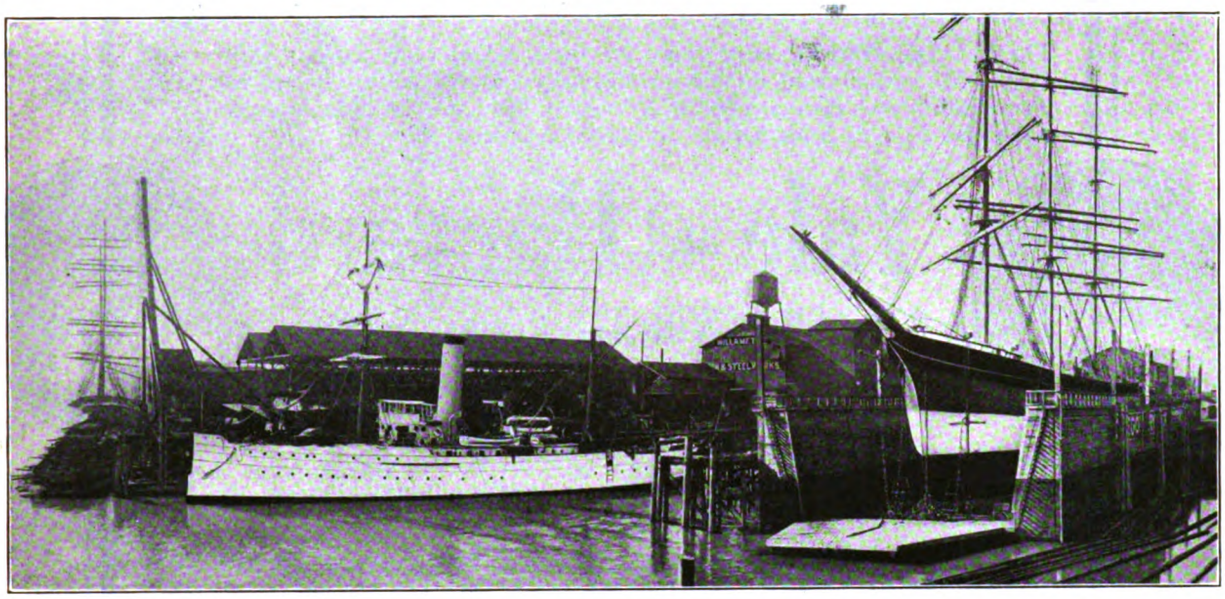
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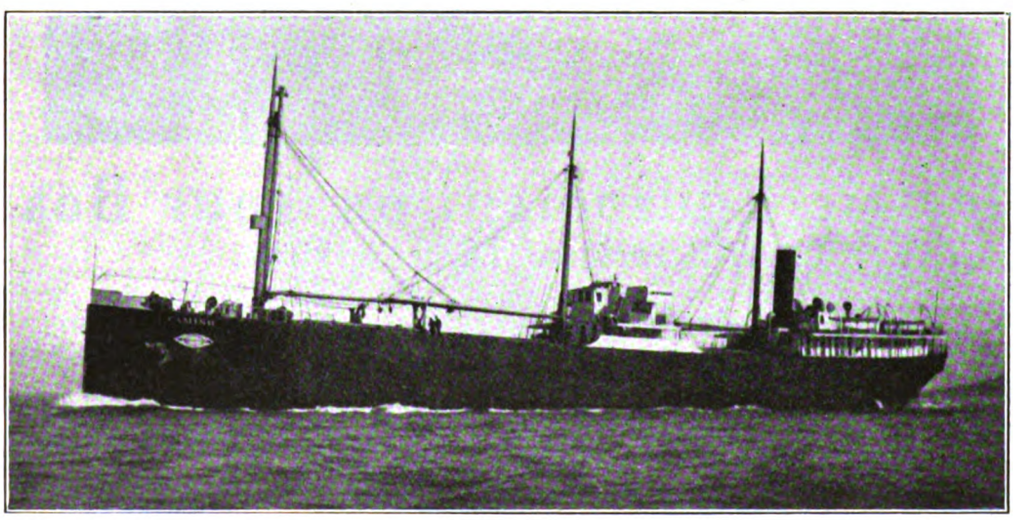
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From Stone Cold to Full Power in Ten Seconds

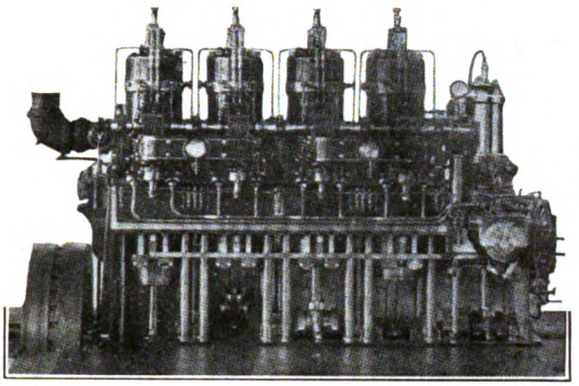


Illustration shows the 150 I. H. P.

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Read the letter below and then write for our guaranteed trial proposition. It'll pay you.

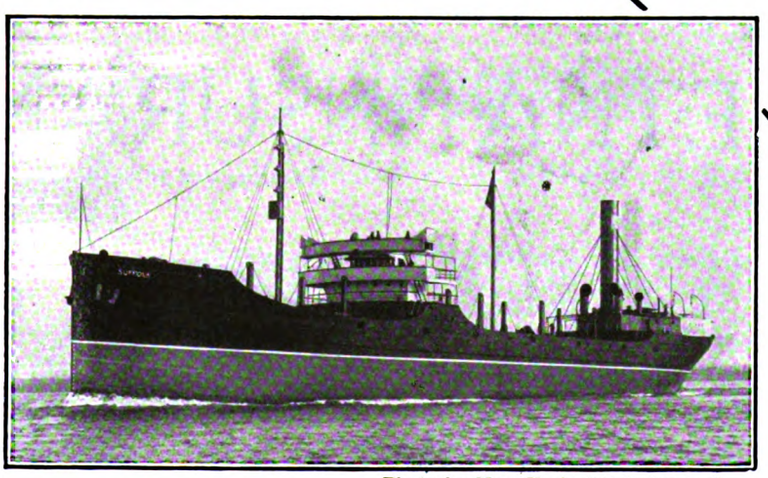


Photo by New York Shipbuilding Co.

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I save coal and time, get drier steam and have no leaks."

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"Watch the Thermometer"

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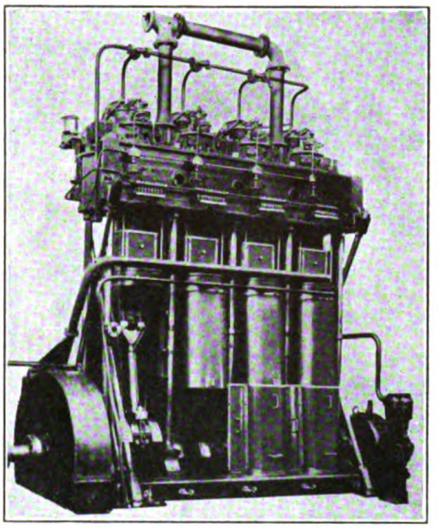
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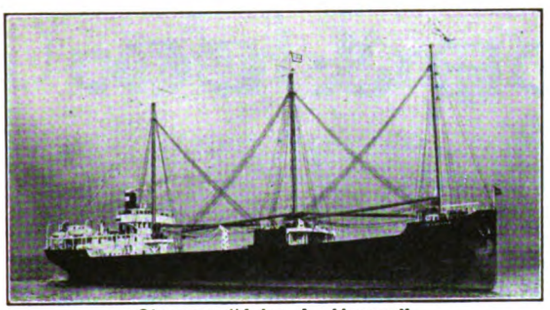
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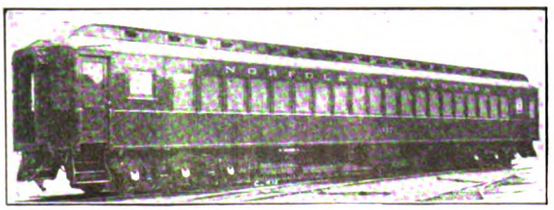
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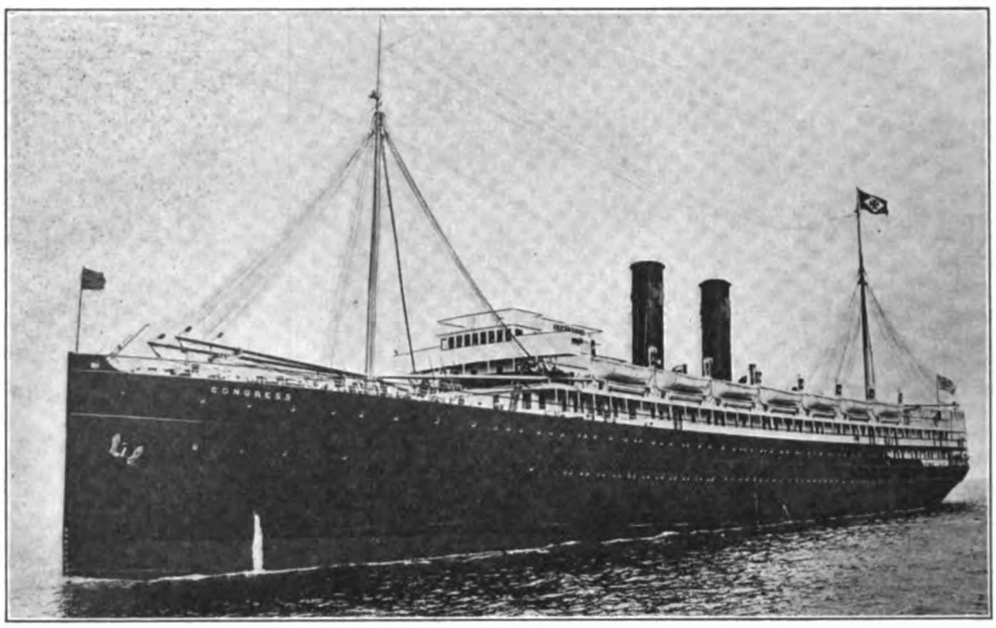
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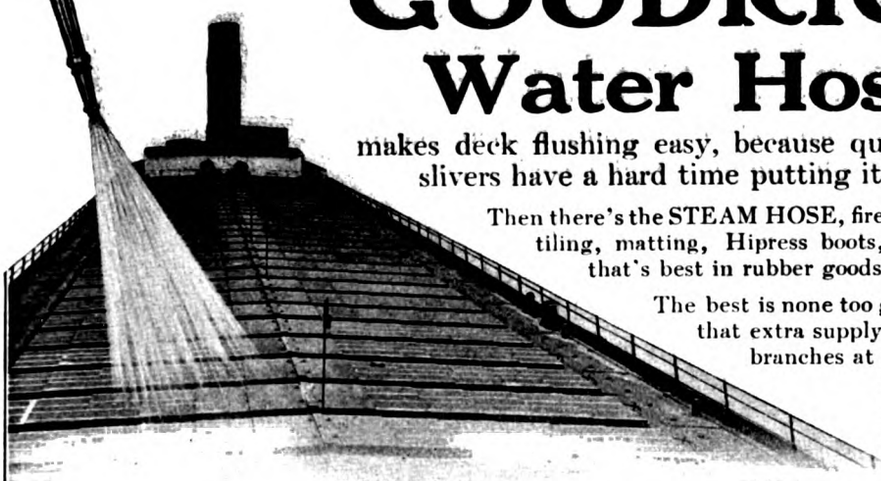
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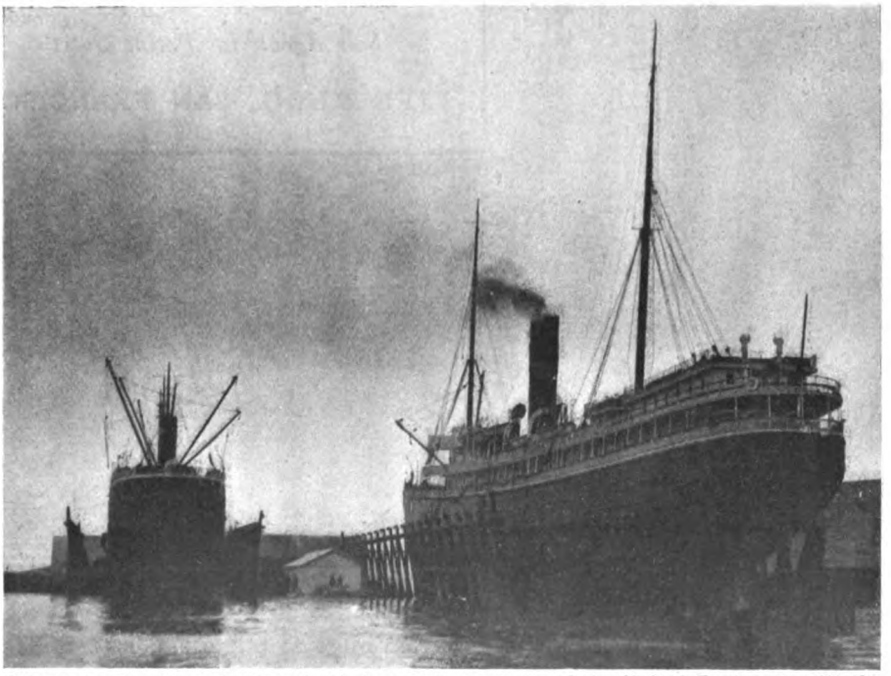
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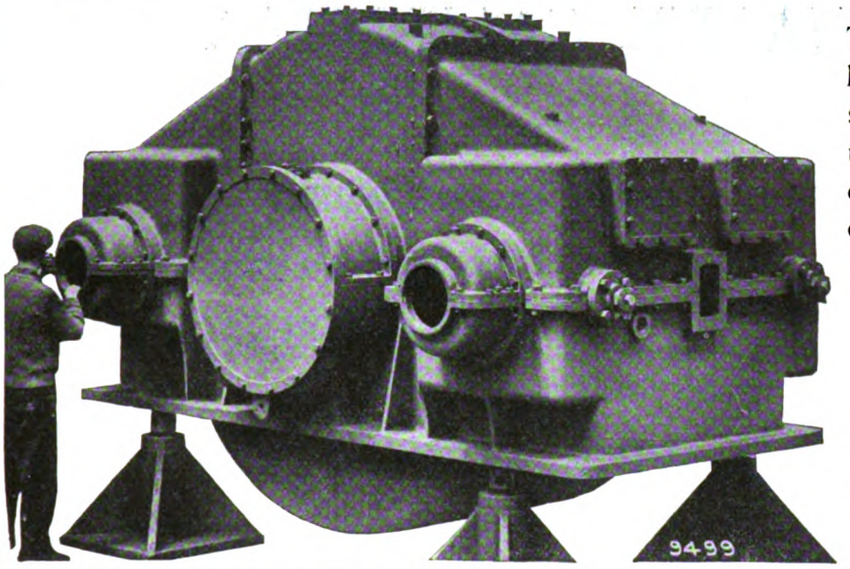
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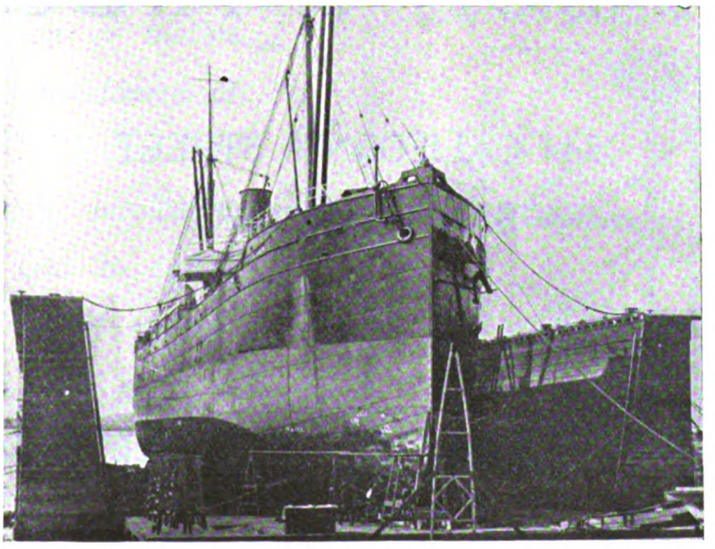
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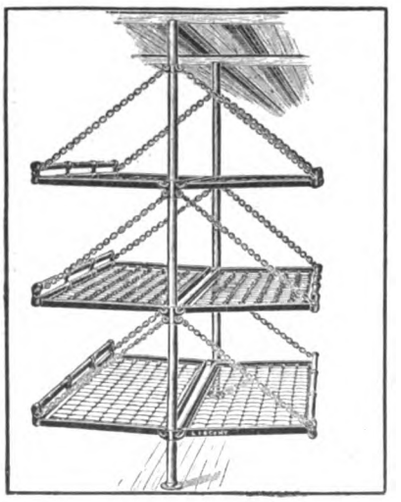
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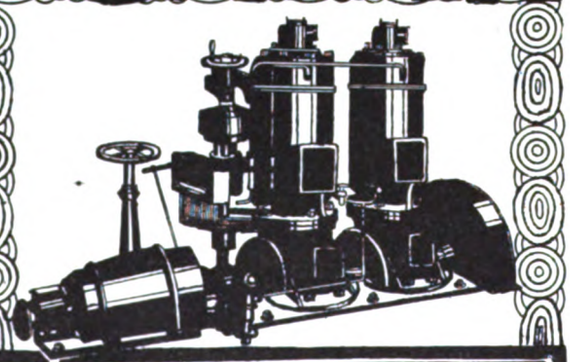
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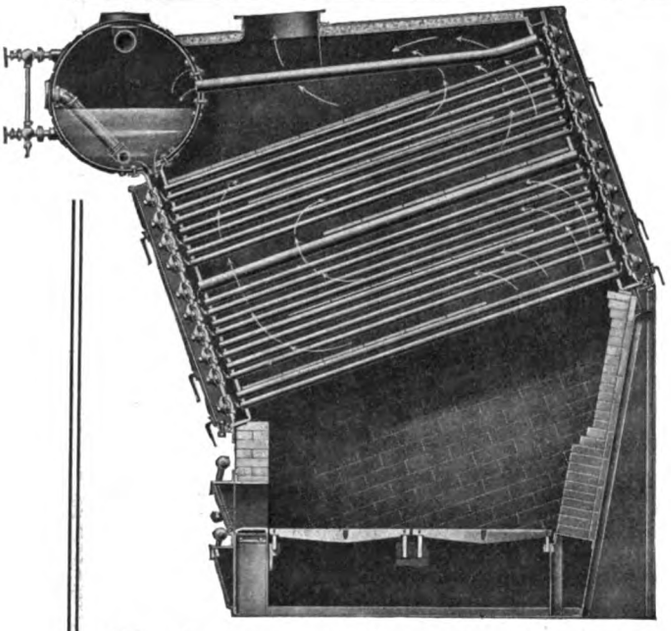
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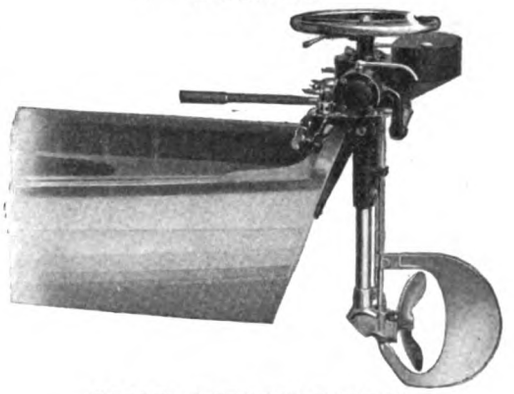
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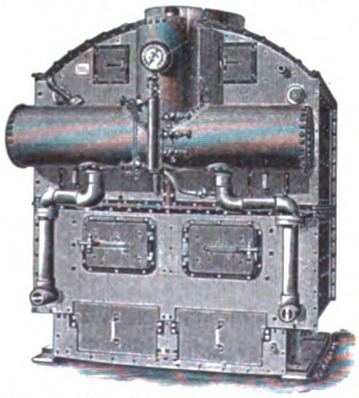
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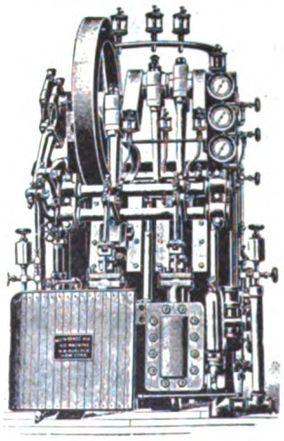
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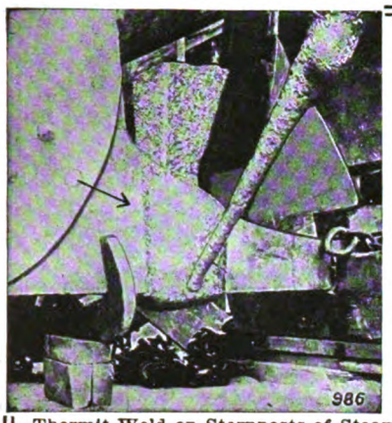
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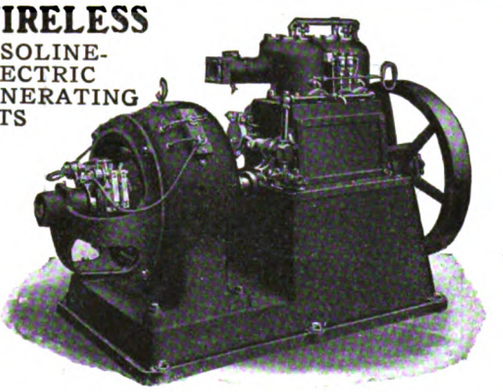
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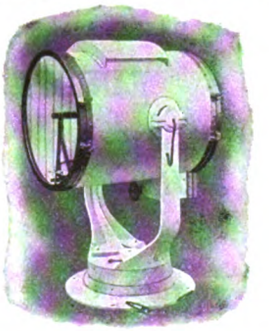
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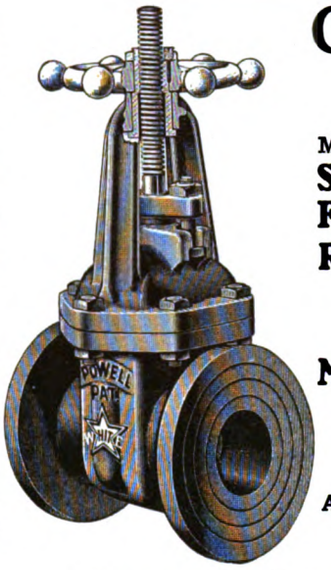
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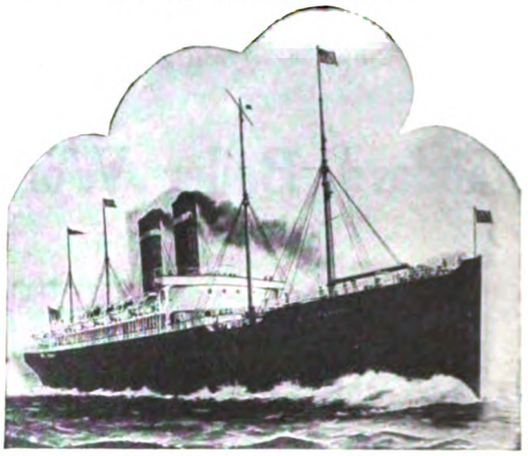
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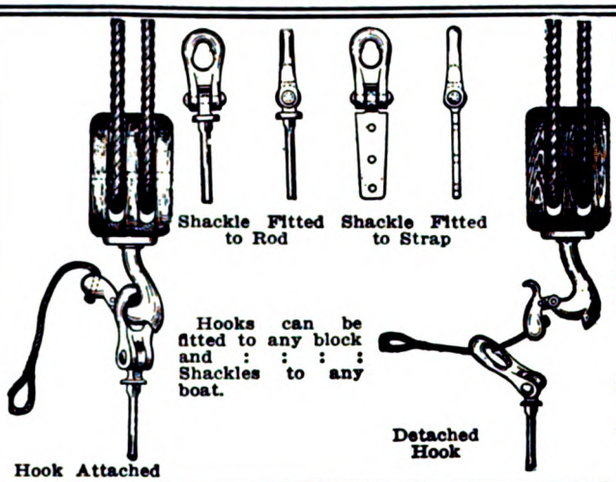
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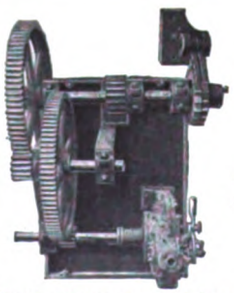
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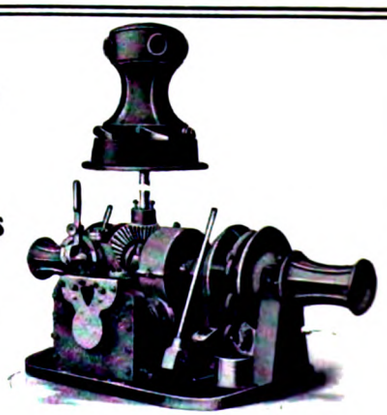
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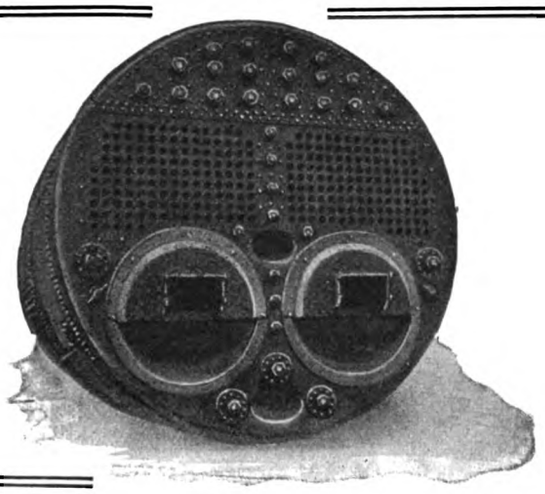
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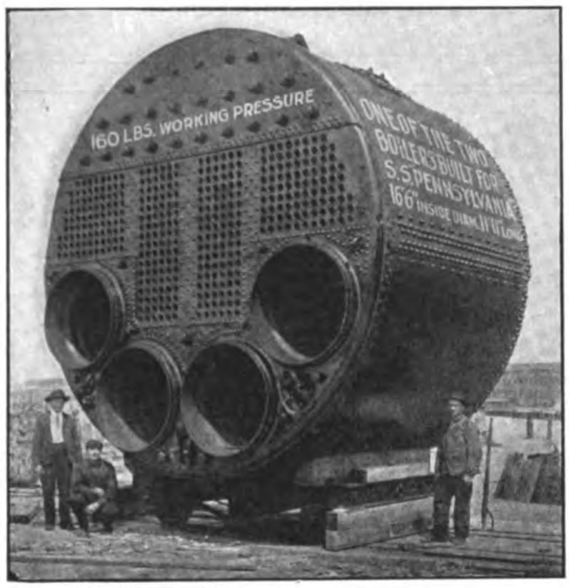
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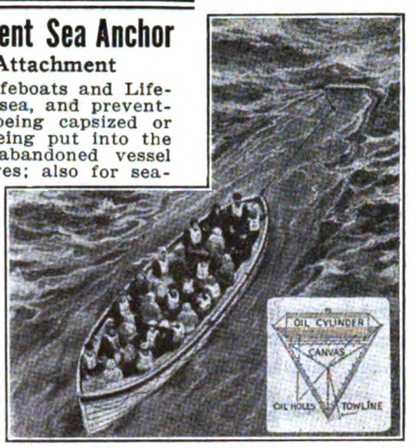
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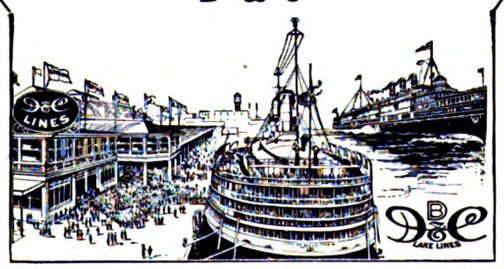
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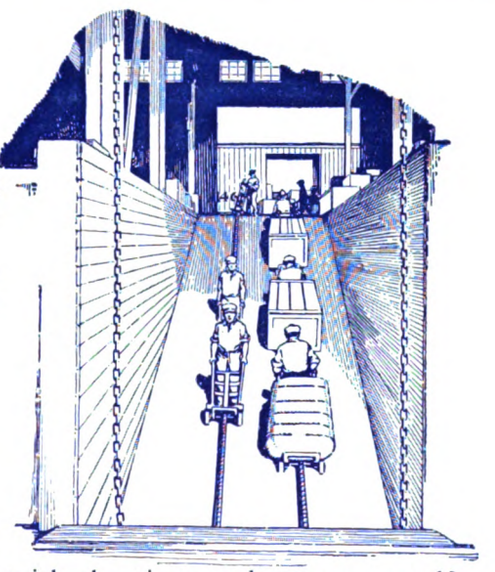
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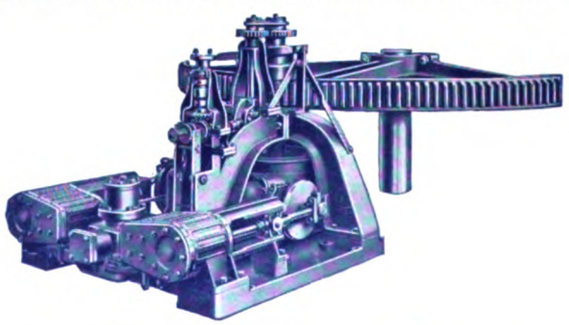
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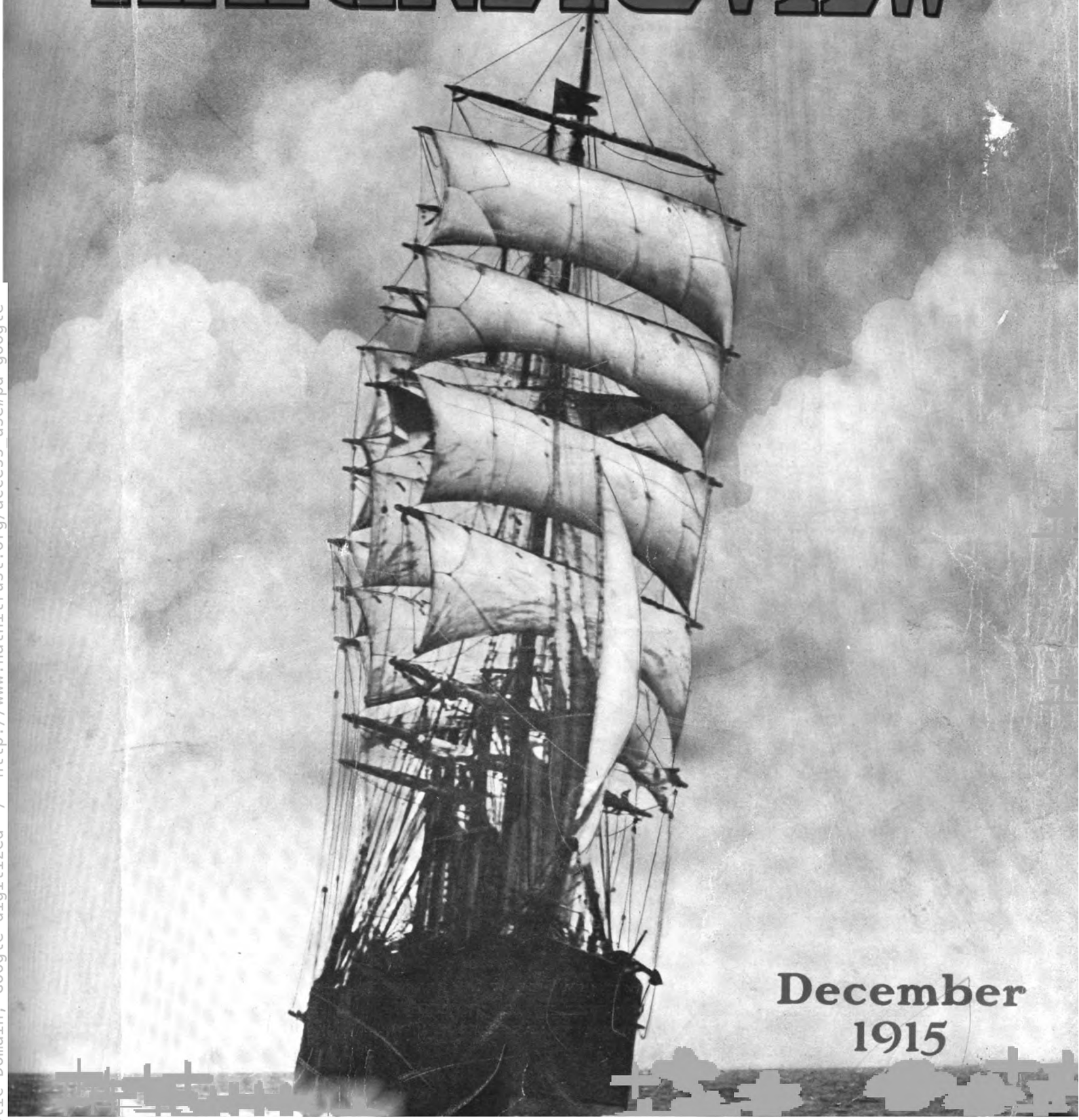
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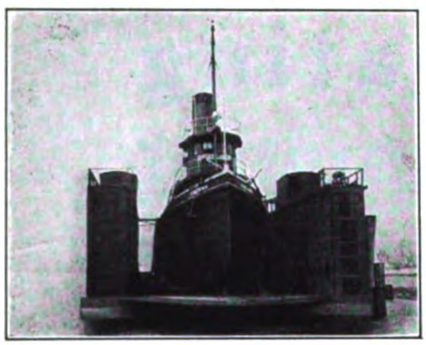
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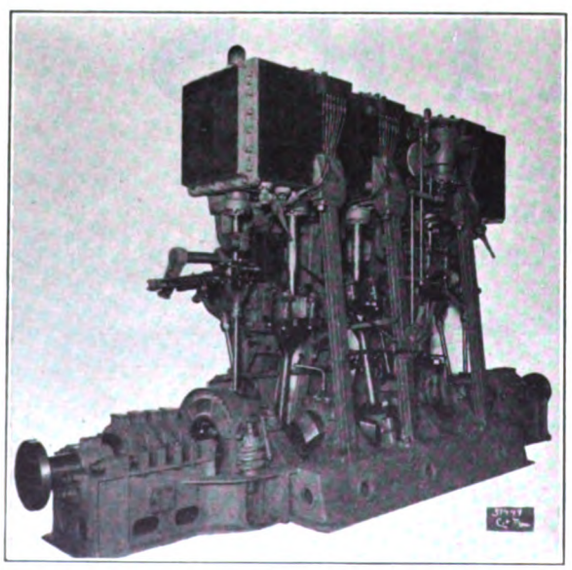


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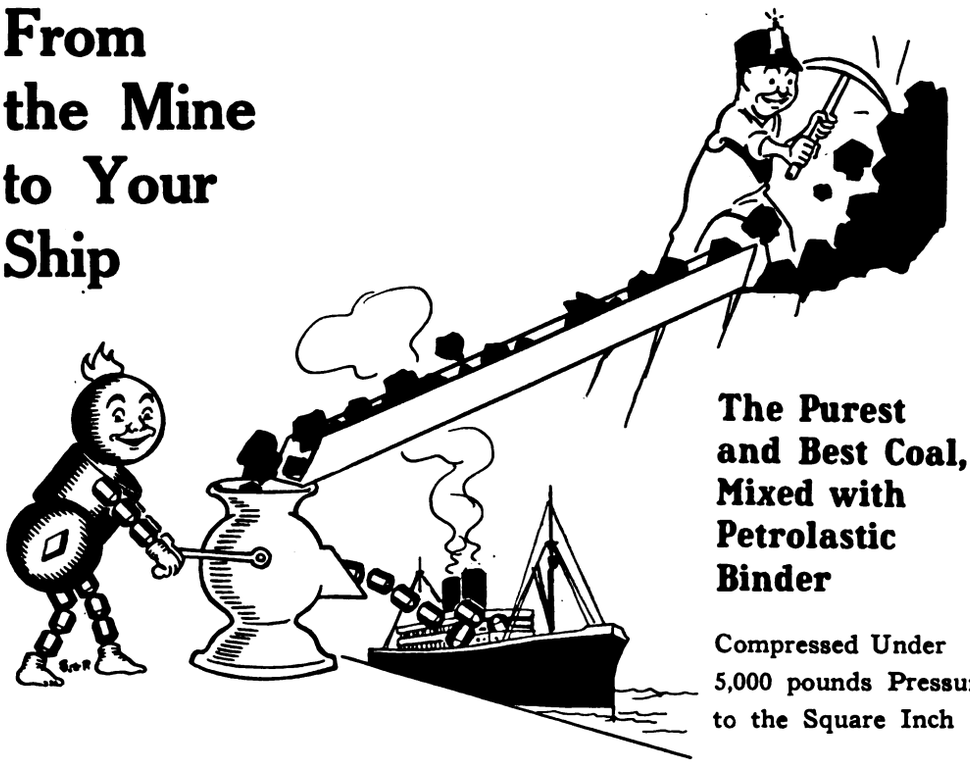
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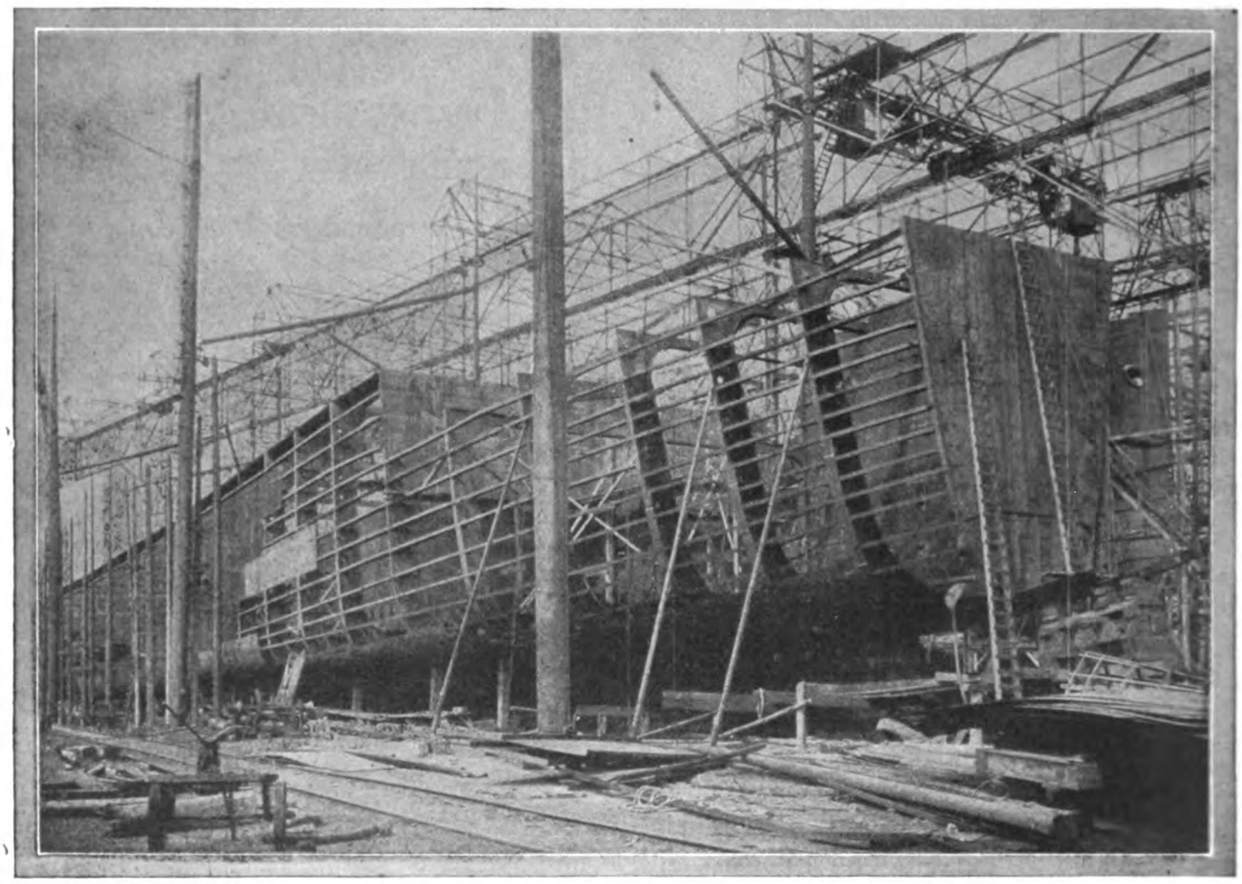
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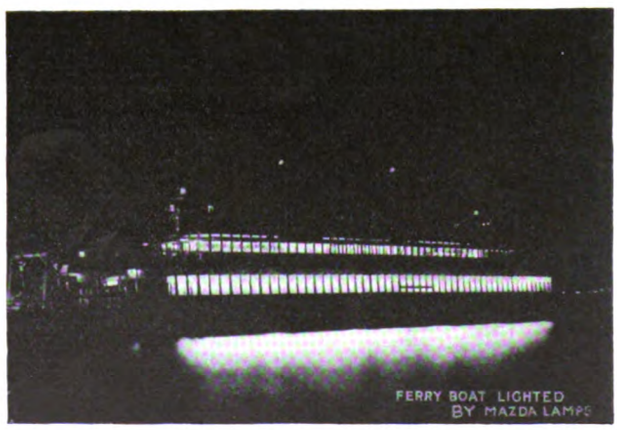
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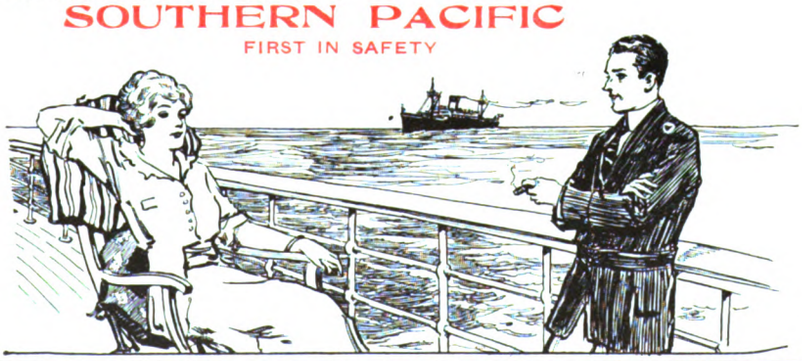
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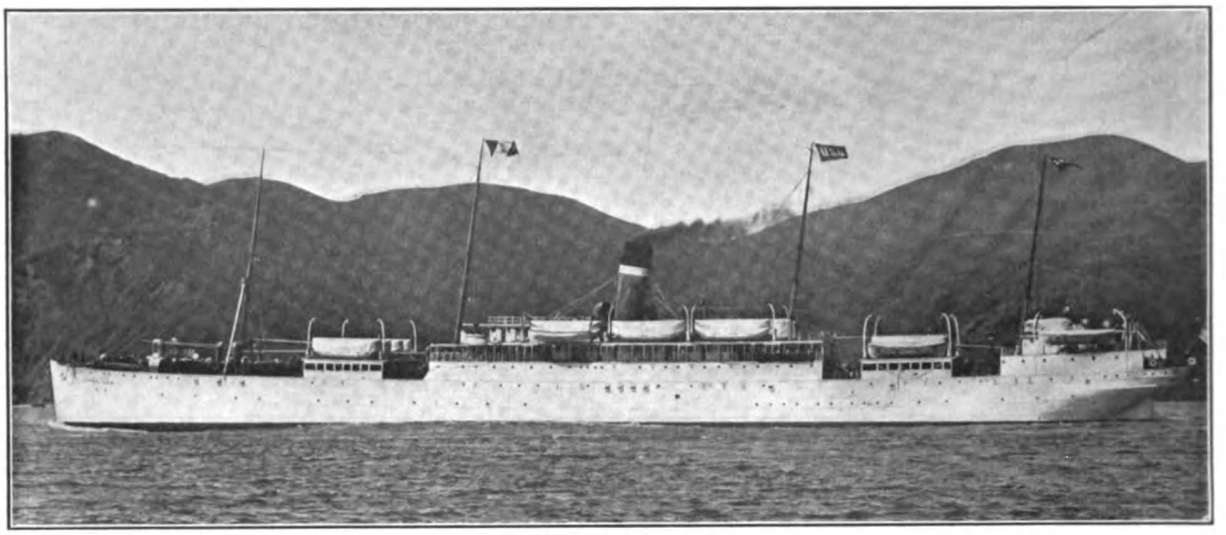


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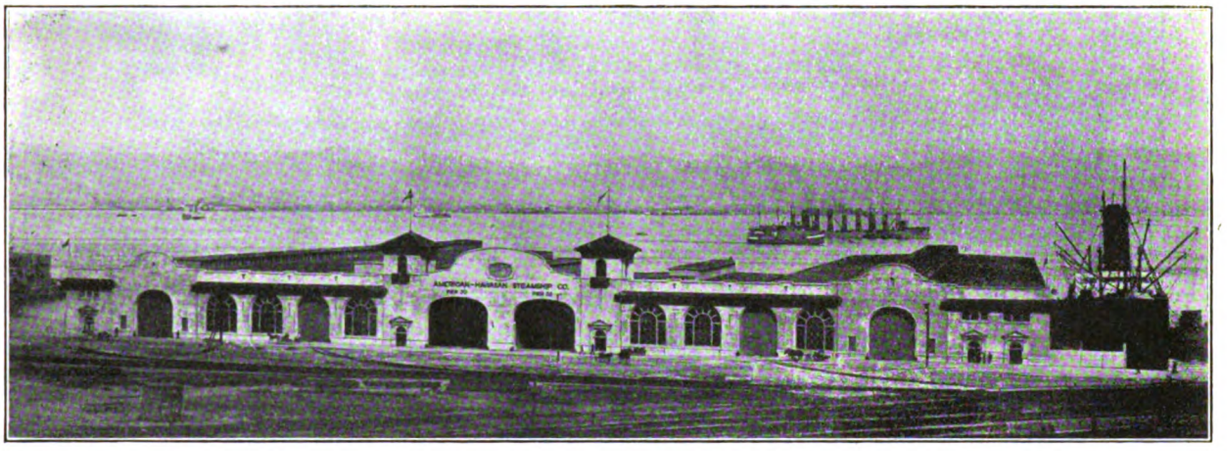
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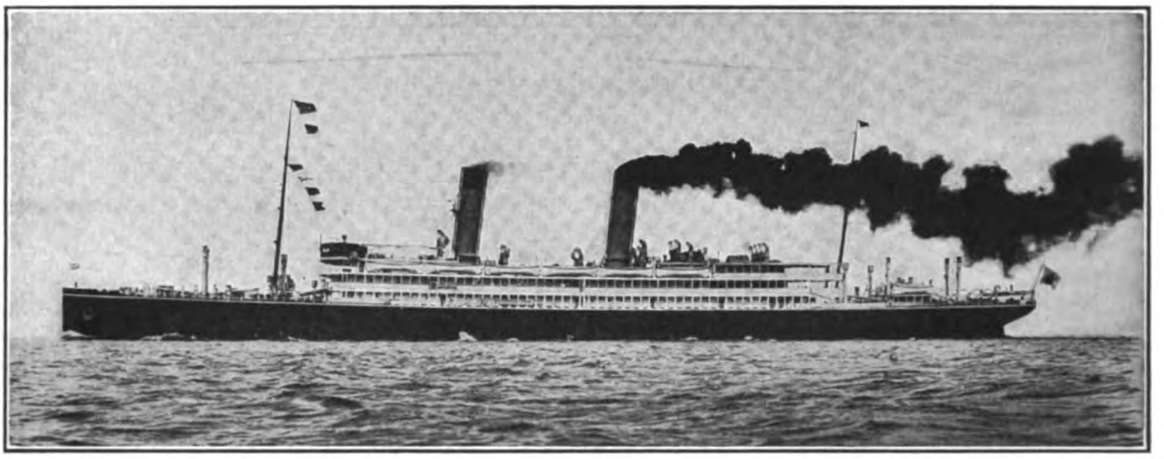
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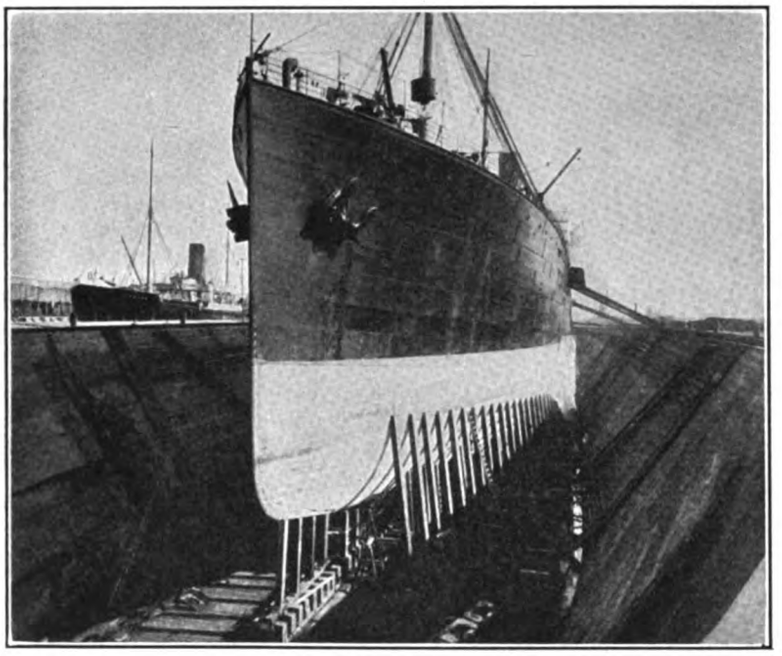
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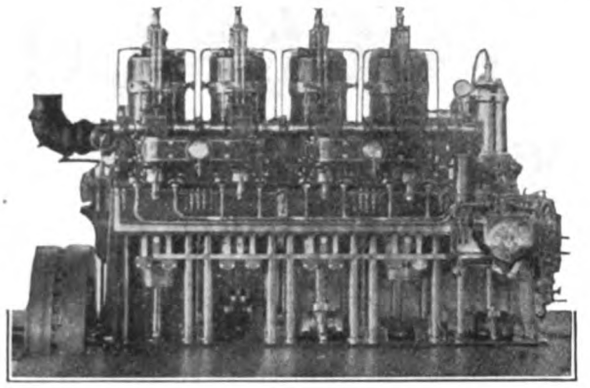
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The time consumed in getting the average engine from stone cold to full power is a considerable factor in producing maximum efficiency and economy. When ONLY ten seconds is required for the operation you can appreciate the amount of time and money that can be saved by the

Southwark-Harris Valveless Oil Engine

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Which will produce full power in ten seconds or less

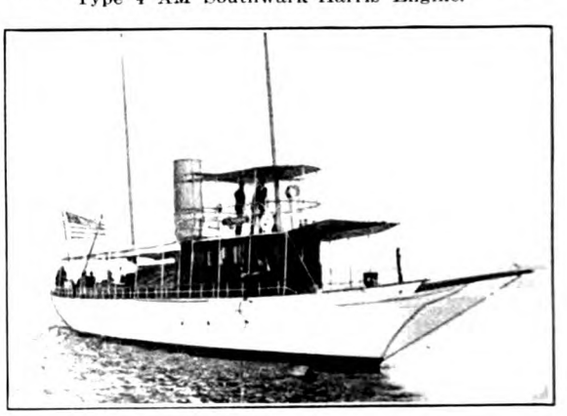
This engine has proved the most reliable of heavy oil engines. It is of the two-cycle type, built in two, four, six or eight cylinder units with multi-stage vertical air compressors worked off the crank shaft.

An interlocking device enables the Southwark-Harris Engine to build up its operation on oil while still working on compressed air or reverse from full speed ahead to full speed astern in five seconds. It can be started with a load on or can be slowed down with equal certainty and greater ease than a steam engine of similar power.

A 150 horse-power engine installed in the Yacht "SOUTHWARK" has been in daily operation for several months and recently made a trip from Philadelphia to New York in 24 hours against a stiff northeast wind and sea; consuming but 169 gallons of Mexican Fuel Oil at 2½ cents per gallon. The actual costs were:

For Fuel Oil	**$4.22**
For Lubricating Oil	**.93**
Total	**$5.15**

The Yacht "SOUTHWARK"
Length, 98 ft.; beam, 16 ft.; draft, 7 ft. Equipped with Type 4 AM Southwark-Harris Engine.



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PACIFIC MARINE REVIEW

LARGEST SHIPPING PAPER PUBLISHED IN THE UNITED STATES.

VOL XII., No. 12. SAN FRANCISCO DECEMBER, 1915.

Wooden Shipbuilding Revival

THERE were some small craft built on San Francisco Bay as early as 1849, but the first steamer to navigate local waters was the "Sitka," which was built by the Russians in Alaska. For twenty years after the discovery of gold there was a considerable amount of small marine work in wood performed at San Francisco as well as at other ports, but the harbor was filled with large eastern built sailing vessels, many of which could secure neither crew nor cargo to depart and this condition made ship hulls so cheap that all ideas of building large wooden hulls on the west coast was precluded.

In later years wooden shipbuilding became more of an industry, and in 1868 there were 57 vessels of a total tonnage of 7,000 built on San Francisco Bay. The amount of building fluctuated widely, however, as we find 92 hulls turned out in 1869, 37 in 1870, and 16 in 1871. The first ocean steamer to be turned out was the "Del Norte," in 1865. This steamer was a side-wheeler 187 feet long by 30 feet beam and was built to the order of the Holladay Line by Henry Owens, whose yard was located at the Potrero near the present site of the Union Iron Works.

The firm of Goodall & Nelson, the original inception from which later sprung the present day Pacific Coast Steamship Company, was founded in 1860 and proved good customers for local shipbuilders. This concern did a bay literage and water supply business for several years, but in 1865 branched out and purchased several small craft from Brennan & Company, who owned wharves and other interests on Monterey Bay. Among the craft purchased was the little steamer "Salinas" of 98 tons register. The "Salinas" was built at San Francisco in 1861, and was in continuous service for over twenty-five years. In 1868 Goodall & Nelson had the propeller "Santa Cruz" constructed and the following year the "Monterey." In 1874 this institution incorporated with a capital of $2,000,000, and at that time its fleet comprised the steamers "Salinas," "Santa Cruz," "Monterey," "Kalorama," "Constantine," "Donald," "Los Angeles," "Fideliter," "Gypsy," "Senator," "Pacific," "Mohonge," "Orizaba," "California" and the schooners "Sea Nymph," "Ellen" and "Onward."

In the early eighties the whaling fleets of the Arctic turned their attention towards San Francisco as an outfitting point. Up to this time Honolulu had been favored as winter quarters. In 1884 six steam whalers were built and equipped in San Francisco and the success which followed the steam whalers soon led to the partial abandonment of sail as a motive power for this class of vessel.

The Dickie Brothers about this time forged to the front as wooden shipbuilders, and in 1882 they turned out the propeller "Mexico," by far the largest and most elaborate wooden construction that had yet been attempted on this coast. The "Mexico" was 300 feet long, 36 feet beam and about 21 feet depth of hold. She operated successfully in the coasting trades for about twenty-five years.

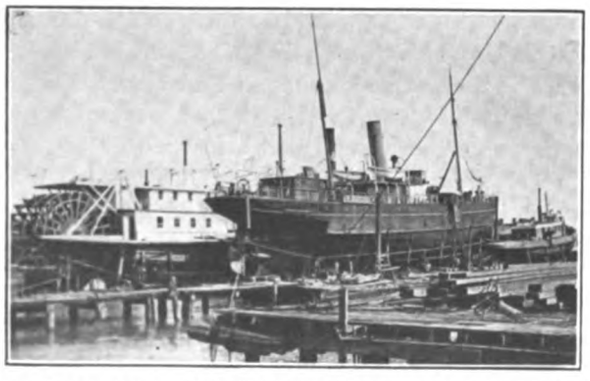
Some of the early builders whose names will be remembered along the waterfront even to-day were Messrs. North, Gates, Collier, Tiernan, White, Turner, Middlemas and Boole. These men laid the foundations for an industry that assumed quite large proportions, then died away with the advent of steel shipbuildings on this coast, but which has lately shown unmistakable signs of a healthy revival. This revival is based on the cheapness of wooden hulls as compared to steel, the present day scarcity of tonnage and the growing conviction that the wooden vessel possesses many advantages in certain trades.

Since the "Mexico" represented probably the

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highest achievement in wooden shipbuilding on the Pacific Coast at the time of her construction, some details of this vessel are sure to prove of interest. She was 300 feet over all in length, 280 feet between perpendiculars, 38′ 0″ extreme beam, 37′ 0″ beam moulded. The keel was 16″ by 22″, and some of it was in 125-foot lengths. The frames were 10″ by 16″ at the heel, and the vessel was framed solid and caulked up to the turn of the bilge. The ceilings were ten inches and edge bolted practically all fore and aft. The outside planking was 4½″. This vessel operated for many years, and it is said by those who knew her in the latter part of her career that no kinks had developed in her shear. She made 12 knots at sea and had accommodations for about 150 passengers. One peculiarity of her construction was the installation of double ceilings, with free air space between, on all her deck houses. This was done to insure cool cabins when running in the tropics. Above the turn of the bilge the frame spacing was filled solid with salt. Her propelling machinery consisted of a 1,200-horsepower compound engine, with cylinders 30 and 60 inches in diameter by 48-inch stroke. The engine was fitted with a Joy valve gear, which gave excellent satisfaction. Steam was supplied by two double-ended boilers 12 feet in diameter by 20 feet long, having two furnaces in each and carrying steam at 80 pounds. The engines turned up 80 revolutions.

That the builders of wooden ships on the Pacific Coast who were operating yards prior to 1900 built well is evidenced by the fact that even in the lists of lumber carriers alone many of their boats were still in service at the opening of the present year, such as the "Newport," built by Dickie Brothers in 1875, and the "Arcata," by the same firm in 1876; the "Whitesboro," built by Charles White in 1886; the "Alcatraz" and "South Bend," built by Charles White, and the "Pasadena," by Hay & Wright in 1887; the "Lakme," by Hinsdale; "National City" and "Noyo," by Hay & Wright; "North Fork," by Bendixen; "Westport," by Boole, and "Del Norte," by J. W. Dickie in 1890; the "Homer," by Reed in 1891; the "Excelsior," by Walker in 1893; the "Tallac," by Wheeler & Son in 1895; the "Coquille River," by Christenson in 1896; the "Brunswick," by Henckendorff; the "Fulton," by Bendixen; the "Hardy," by the Fulton Iron Works, and the "Newbery," by J. W. Dickie in 1898, and the "Aberdeen," "San Pedro" and Despatch," built in 1899. Here we have a list of wooden steam schooners ranging from 15 to 40 years old and still doing their "bit" up and down a coast which is by no means an easy one on shipping.



"The Fox," British steamer "Melmore" and stern wheeler "Frances" at the Pacific Ship Yard and Ways.

In the Northwest.

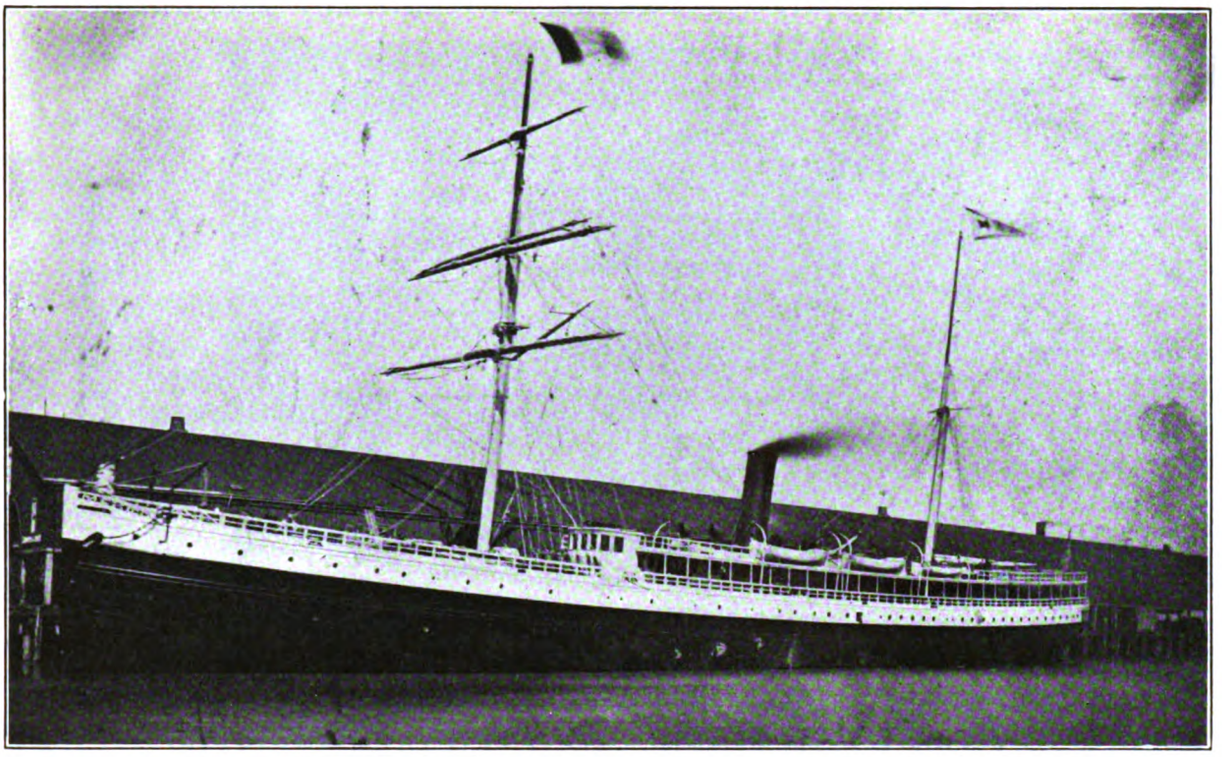
The Northwest is well supplied with yards capable of handling wooden construction with dispatch, and the inexhaustible supply of good ship timber immediately at hand is a strong factor in the great success which has followed the Oregon and Washington builders of wooden hulls. The Seattle Construction and Dry Dock Company deserves mention in this regard, not on account of the construction of wooden hulls, but because of its splendid wood-working equipment that renders that firm highly efficient in cases where large overhaul or repair jobs necessitate extensive alterations or additions to passenger accommodations on steamers. The Anderson Shipbuilding Company has the steamer "Bainbridge" for the Eagle Harbor Transportation Company to its credit. J. F. Duthie & Co. have a stern-wheel river boat 120 by 30 feet for the Northwestern Fisheries Company. Nilson & Kelez have an oil barge for the Standard Oil Company. John Wilson & Co. have the small freighter "Amazon" with an 80-horsepower Fairbanks & Morse semi-Diesel installed. At Hoquiam the Mathews Shipbuilding Company has an 800,000-foot steam schooner, with accommodations for 27 passengers, on hand for the Hart Wood Lumber Company and another steam schooner 195 by 44 by 14 feet in dimensions for the Charles H. Higgins Company.

In an effort to meet the steadily increasing demands for larger building berth equipment necessary for the new naval work, the Fore River Shipbuilding Company is to install a new building ways 138 feet wide by 800 feet long with steel framework for carrying the overhead cranes.

The Pacific Shipyard and Ways.

While the firm name of Pacific Shipyard and Ways is new, having been adopted in 1911, this concern, as successors to Hay & Wright, may be considered one of the old-time firms that took part in the wooden shipbuilding of this coast in the days of great activity and which is now ready both with skill and equipment to take advantage of the growing demand for wooden hulls. Cap-

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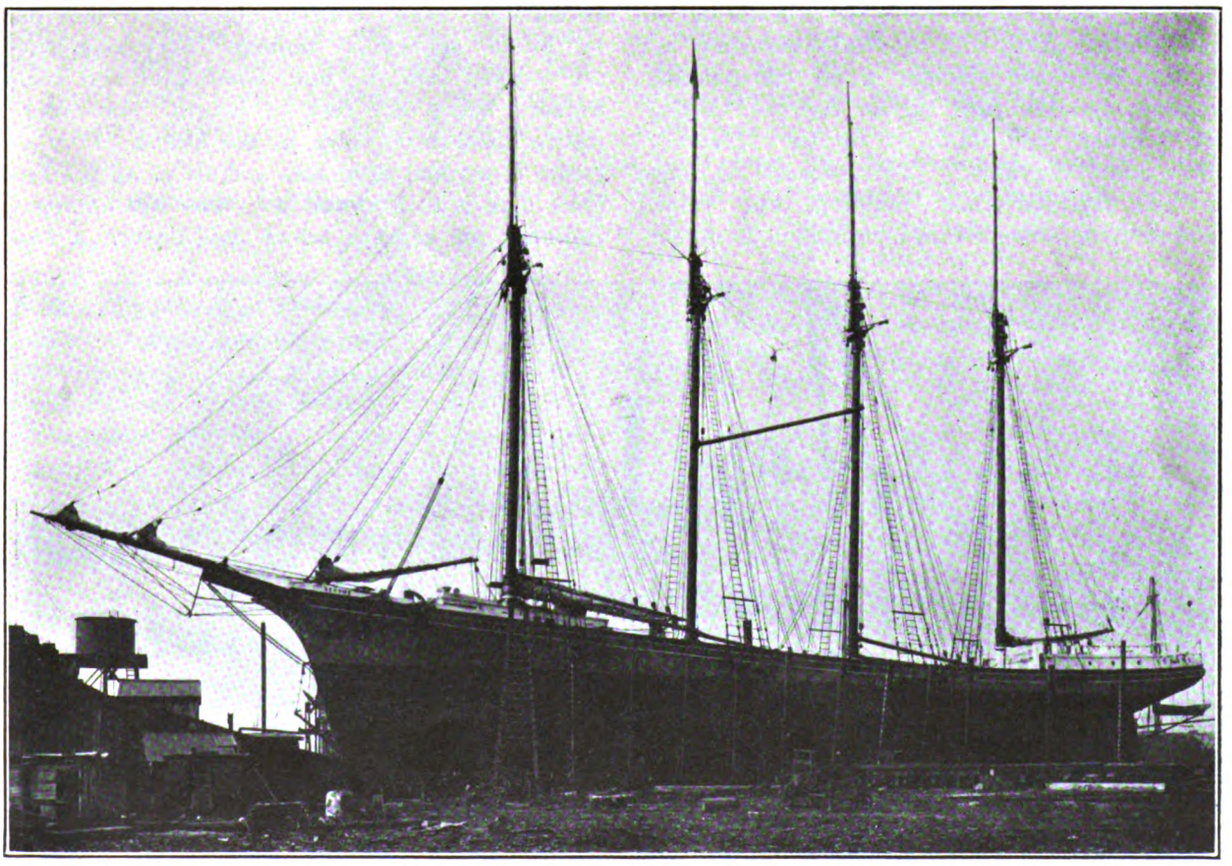


The "Mexico," the largest wooden ocean steamer ever built on the Pacific Coast.

tain Tibbits is the active head of this concern, which is fully equipped to build vessels up to 300 feet in length and which has a long succession of successful ships to its credit built during the '80s and '90s and later by the original firm.

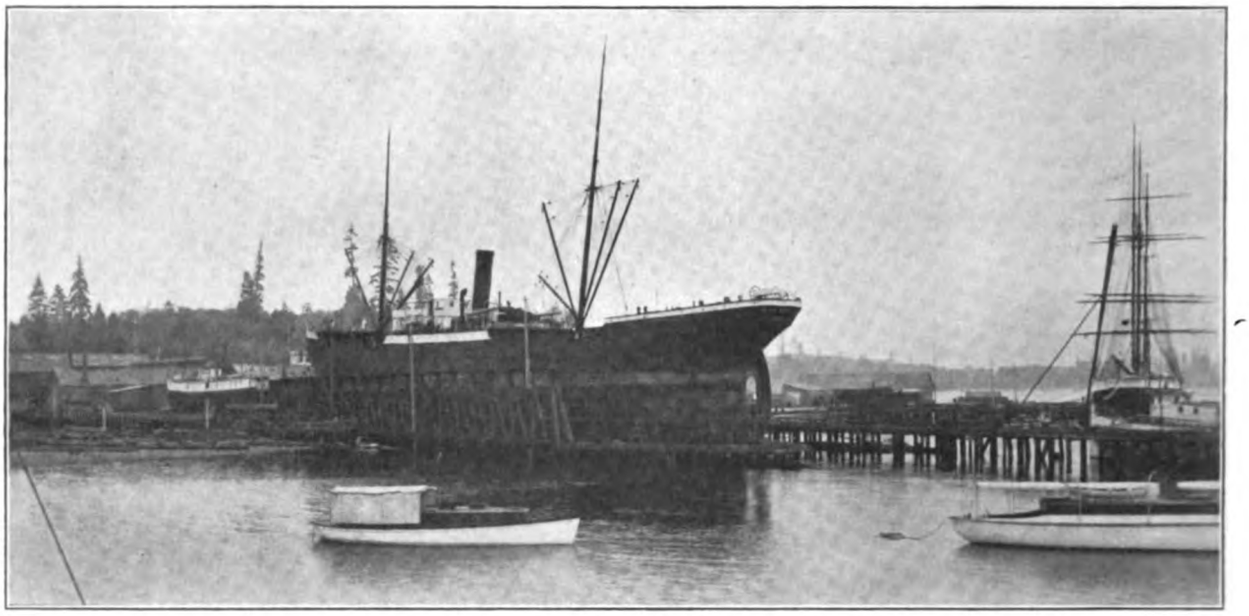
The St. Helens Plant.

The establishment of a shipbuilding yard at St. Helens, Oregon, was the outcome of a combination of favorable circumstances. The Charles R. McCormick Company possessed vast tracts of



The schooner "Seahome" at the Pacific Shipyard and Ways.

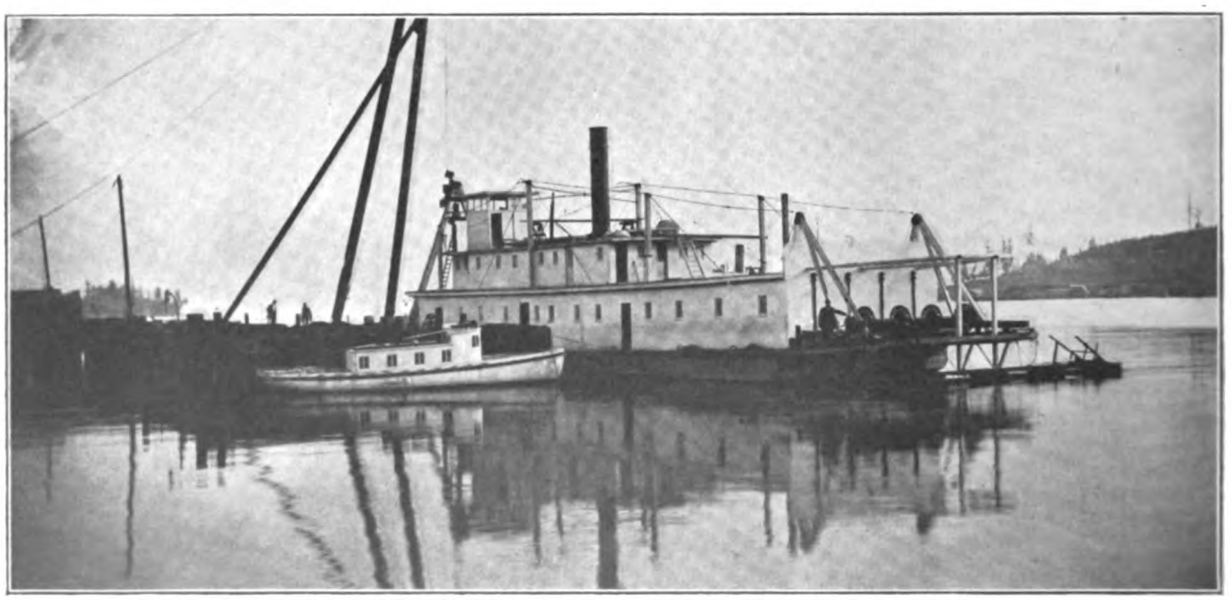
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The marine railway at the Hall Brothers plant. Steamer "San Mateo" on dock.

splendid timber and vessels were needed to transport this timber to the various coast as well as foreign markets. This necessity sent the McCormick people into the lumber-carrying trade and once in the shipping business the fact that, in a certain sense, some of their finest timber was being wasted was borne in upon them. This refers, of course, to the heavy timbers of great length which were available. They naturally turned to the building of steam schooners of about 1,000,000 feet capacity, this being a suitable size for entering the various timber ports and at the same time not being too large for efficient wood construction. Four years ago the yard turned out the "Multonomah," which was followed by the "Merced," "Celilo" and "Wapama." The success of these boats has justified their building, but indeed wooden schooners needed no justification as moderate-sized steam schooners of wood have navigated the coast successfully for periods sometimes extending over twenty-five years.

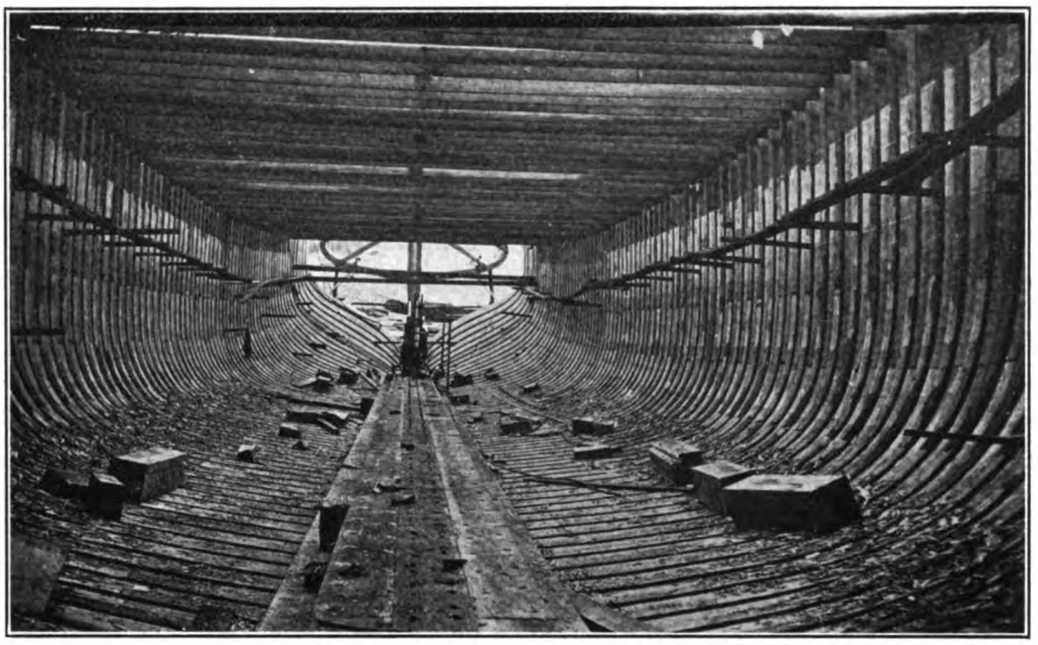
The latest venture at St. Helens is arousing a great deal of interest as it marks a departure from the old accepted order of things on this Coast. A vessel is now on the stocks, her construction being pictured herewith, 278 feet long, 48 feet beam and 19 feet depth of hold, with a lumber capacity of 2,000,000 feet. As will be noted, the hull is of exceedingly heavy construction, the frames being 18″ by 24″ spaced 32″ centers. Very long lengths are worked into the hull, some keel and keelson timbers being 120 feet in length. In order to insure absolute rigidity to the hull a heavy steel girder is worked right fore and aft along the center line. She is to be fitted with two 320 horsepower Bolinder oil engines which will insure a loaded



The Government snag boat "Snohomish" at the Hall Brothers Yard.

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speed of about 7½ knots and as the vessel is rigged as a five-masted schooner it is expected that her auxiliary power will give her the same despatch as the ordinary steam schooner operating on the Pacific. As oil tanks will be fitted to carry fuel for sixty days' running, the radius of action will be practically unlimited. This vessel, like the four preceding ones at the St. Helens yard is being built under the supervision of Mr. J. H. Price and will be launched about the middle of February.



Interior view of hull of big wooden lumber carrier building at St Helens.

From an investment point of view, the points advanced in favor of the wooden construction may be briefly stated as follows: that four carriers of 2,000,000 feet capacity can be built for the cost of one 5,000,000 feet steel steamer; that a cargo of 2,000,000 feet is not too large to be readily absorbed at either foreign or domestic ports, that the loss of a ship of this size and capacity would not necessarily cripple a firm's trade and finally that the auxiliary power feature presents marked economies in operating costs over either a steam or sailing schooner.

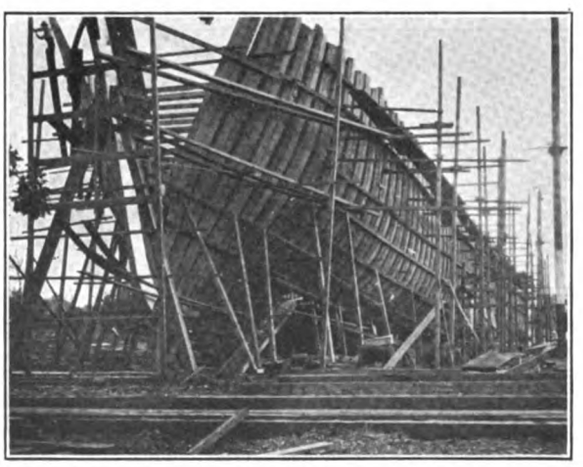
Johnson and Lanteri.

The firm of Johnson and Lanteri is one of the younger firms that have been forging their way to the front among wooden shipbuilders of late years. Established at Pittsburg, California, about six years ago, this firm already has built up a fine reputation in dredger work, having built no less than ten dredgers, some of them among the largest clam-shell bucket dredges afloat to-day. A number of wooden barges and tug boats have also been turned out and a large amount of overhaul and repair work has found its way to this yard. The plant is well equipped with wood-working machinery and a system of masts, shear legs and derricks has been installed that has proven most satisfactory in the handling of the very heavy timbers which are a feature of all west coast shipbuilding.

Hanlon's Yard.

The Hanlon Dry Dock and Shipbuilding Company is a new concern but its active head, Mr. Dan Hanlon, has had many years' experience as a wooden shipbuilder and is making all preparations to enter the field well equipped to handle all classes of wooden construction. A marine ways of 4000 tons capacity is being installed at the yards in Oakland and also a smaller marine ways of 1500 tons rating. The larger ways will have a length of cradle of 320 feet and width of 65 feet with a depth of 18′ 6″ on the outer block and 13′ 0″ at the bow blocks when submerged at mean low water. At the present time the Hanlon yard is finishing up two large barges for the Shell Oil Company and also an interesting barge with new cutting devices for harvesting kelp.

Other work around San Francisco Bay includes a ferry boat for the Richmond and San Rafael Ferry & Transportation Company building at the Benicia Shipyards Company. John Twigg & Son have the "Lyra" to their credit. The "Lyra" is a 65-foot motor cruiser building for Gordon Blanding of Belvedere. Moore & Scott, while not primarily wooden shipbuilders, have two small hulls, one coal hoist float and one barge turned out recently



The heavy framing of the new McCormick schooner.

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while the United Engineering Works are constructing the hull and semi-diesel engine for a Mexican coast trading schooner to be delivered during February.

G. R. Bolander Company.

In connection with the renewed interest being manifested in wooden shipbuilding all along the Pacific Coast, the business of making masts and spars is feeling the need of expansion. Masts, spars and poles are products in which the Pacific Coast leads the world, and it is only natural that



The sandpapering machine at work on a pole.

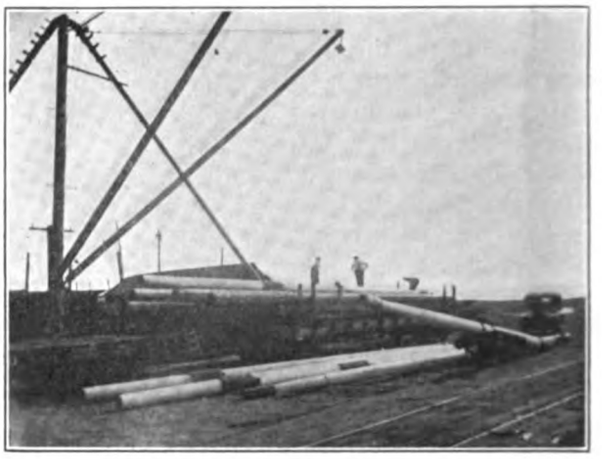
machinery for the finishing of these products should have been perfected here.

It is stated that G. R. Bolander Co. are contemplating the erection of a lumber mill and shipyard somewhere on Puget Sound in connection with their present East Oakland and Alameda plants. Their East Oakland plant has had three machines running in addition to extra gangs chopping out poles, masts or spars. The machines, which are covered by patent rights both here and abroad, are adjustable to a wide range of work, and in any case where the same shape is repeated a large number of times their use results in a very large saving in labor. The fact that these



Twelve cargo booms for an eastern-built freighter.

machines could be utilized to produce practically any sawn, turned or tooled shape in wood has led to a careful study of their possible economies in ship construction, with the result that G. R.



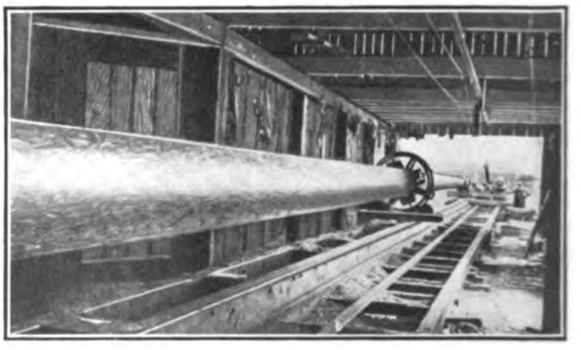
Loading spars for eastern buyers.

Bolander Co. are now ready to enter the shipbuilding field.

The spar machine turns out timbers free from torn-out knots or slivers, while the following sand paper machine insures a perfect cylindrical section free from flats or hollows. These spars can be finished oxagon or square and tapered to any desired form.

The planking and scarphing machine runs planking to any desired shape with bevel and caulking seam in one operation and assures a smooth, true surface ready to be placed in the planking of a vessel. The machine also runs scarphs on timber or planks with or without caulking seam, making a planed surface that is an exact fit.

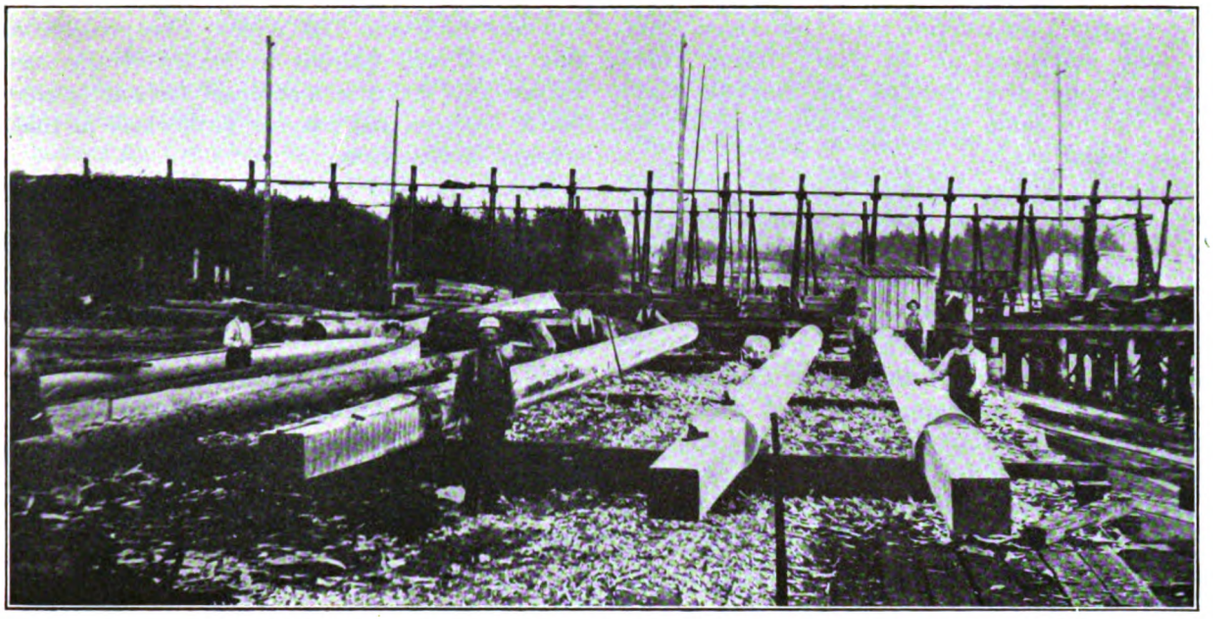
The old method of working out ships' planking or scarphing is to first mark out, then either hand



A 127-foot pole in the spar machine of the Oakland plant of G. R. Bolander Company.

saw or hand chop to line, then plane by hand to secure an even surface and then mark for caulking seam, working this out by hand. The machine method shows distinct advantages over this process both as to time and workmanship, and it is reasoned that a saving of one-third can be

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A set of masts for a schooner at Hall Brothers' Yard.

obtained in the time necessary to turn out a wooden hull.

G. R. Bolander Co. have turned out a great number of the ornamental poles that adorn the Panama-Pacific International Exposition grounds. In the case of the arc light standards they used a special machine to cut out the slots for the wires. This same machine can be used to slot dredger spuds, etc., for the iron wearing strips frequently fitted on such work.

Realizing the extended use to which this special wood-working machinery can be put, G. R. Bolander Co. are making arrangements to establish a plant at New York for building barges and dredges, and where a large stock of spars and timbers in round will be kept on hand. With plants on both the Atlantic and Pacific fitted with spar machines, this concern will be able to offer a speed of delivery in cases of vessels with lost or damaged spars that has never before been equaled, while the use of the shaping machines on a large part of the timber entering into the hull of a ship or barge possesses advantages that cannot fail but attract a great deal of interest among shipbuilders.

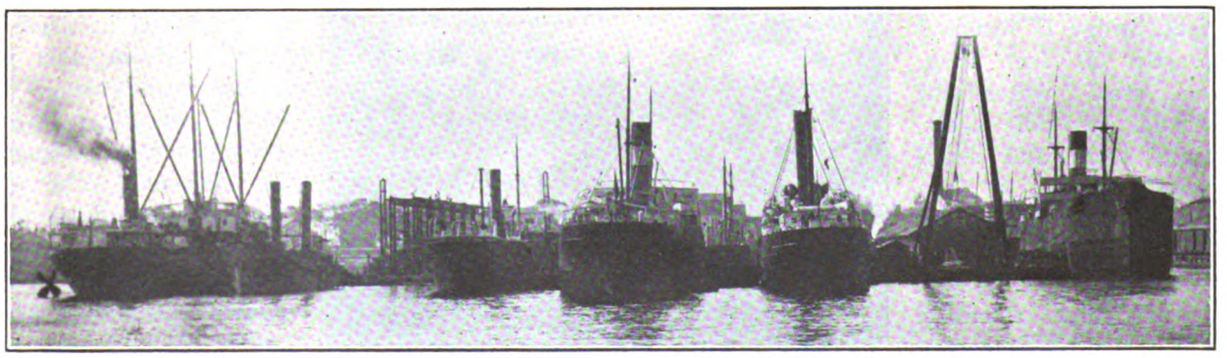
SHIPBUILDING.

The Munson Steamship Company has ordered a freighter 385′ by 54′ by 30′ in dimensions from the Newport News Shipbuilding and Dry Dock Company. The price is said to be in the neighborhood of $625,000, delivery April, 1917. The vessel is for the coastwise trade.

The Pittsburg Steamship Company has ordered two 600′, 12,000-ton deadweight carriers for the Lake Superior trade. One contract goes to the American Shipbuilding Company, the other to the Great Lakes Engineering Company. The American Shipbuilding Company has also secured a contract for a 12,000-ton carrier from the Interlake Steamship Company of Cleveland, Ohio.

The Coastwise Transportation Company has contracted for their seventh vessel from the New York Shipbuilding Company. The new vessel will be a 12,000-ton collier. An eight vessel of 9000 tons is now contemplated.

The recent batch of Navy contracts, calling for an outlay of about $13,000,000, was divided as follows: Two destroyers to the Cramp yard, one destroyer to the Bath Iron Works, one destroyer



The water front of the lower yards, Baltimore Shipbuilding & Drydock Company.

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to the Seattle Construction and Dry Dock Company, one destroyer to the Mare Island Navy Yard, and one destroyer to the Norfolk Navy Yard. At the same time contracts were let for sixteen submarines.

The Lehigh Valley Railroad Company has contracted with the Staten Island Shipbuilding Company for a steel tug 109′ by 28′ by 14½′, also with Theodore A. Crane's Sons Company for two harbor barges 120′ by 34′ by 10′, 600 tons deadweight, and six barges 90′ by 30′ by 9′, 400 tons deadweight. The American Bridge Company of St. Louis is also supplying this road with three steel car floats 180′ by 36′ by 10′ and four steel car floats 260′ by 36′ by 10¼′.

The Fore River Shipbuilding Corporation has made preparations for the erection of a building slip 800′ long and 138′ wide. The prosecution of this work will become necessary if the concern succeeds in securing a contract for one of the new battle cruisers that may be authorized at the next session of Congress.

The A. H. Bull Insular Steamship Company has contracted with the Maryland Steel Company for two single screw freighters 348′ by 46½′ by 26¼′ general dimensions. The steamer "Clare" building at the same yard for the Bull people held successful trials October 25.

The Merritt & Chapman Wrecking Company of New York have ordered a steel hull from the Great Lakes Engineering Works of Detroit. Delivery is called for in May and the size of the hull is to be up to the limit of the Welland Canal locks.

Single Screw Collier "Jonancy"

THE New York Shipbuilding Company launched at Camden, N. J., the 9th instant, a steel crew collier of the following dimensions:

Length between perpendiculars	319′ 0″
Beam, moulded	49′ 3″
Depth, moulded	27′ 6″
Draft, loaded	22′ 8″
Dead weight carried at this draft	5,450 tons
Gross tonnage	3,625 "
Speed at sea, loaded	10½ knots

The vessel has been built to the order of the Pocahontas Navigation Company and is of the same type as the "Norfolk," built by the New York Shipbuilding Company for the Coastwise Transportation Company. The construction is in accordance with the requirements of Lloyd's Register.

The vessel has a single deck of steel, with poop 80 feet, bridge 17 feet and forecastle 30 feet long, seven steel water-tight bulkheads, two pole masts, straight stem and semi-elliptical stern. A deep double bottom is fitted all fore and aft for the carriage of water ballast, and particular attention has been paid to the construction of this part of the vessel, the plating being of extra strength and fitted flush; no wood ceiling is fitted. A deep tank is also fitted amidships for the carriage of water ballast. The four cargo holds are entirely clear of beams and pillars, the deck being supported by deep arched beams and web frames fitted midway between the water-tight bulkheads; a continuous trunk 24 inches deep by 28 feet wide is carried on the upper deck for the full length of the cargo spaces, the sides forming strength girders between the bulkheads. Large steel cargo hatches are fitted in top of this trunk, eight in all, two to each hold. Eight steam winches are fitted in connection with two masts, fitted with four booms each, for the working of the cargo. Four pairs of king posts for raising the hatch covers and securing them in place when open are fitted. The coal bunkers are at the sides of the vessel in the boiler room and in the poop between decks, with hatches on the poop deck and pockets leading to the fireroom. The peaks are both fitted as water ballast tanks. The accommodation consists of a midship deckhouse on the bridge deck for the captain's stateroom and spare

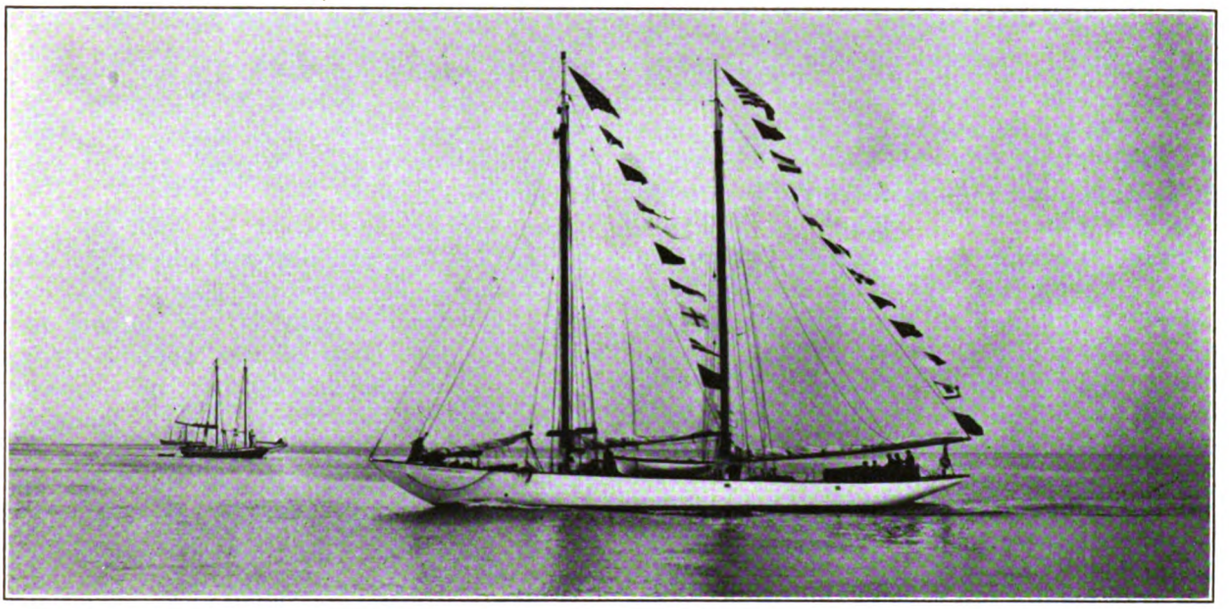


Launch of the "Jonancy," New York Shipbuilding Co.

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room, with a pilothouse over; the saloon, officers' and petty officers' berths, pantry, toilet, etc., are in the bridge; the engineers, cooks, steward, mess rooms, refrigerator, toilets, galley, etc., are in side deck houses on the poop deck, and the oilers, seamen and firemen are berthed in the poop abreast the engine casing.

A steam windlass is fitted forward with the wildcats and warping ends on the forecastle deck, and the engine fitted below in forecastle. A steam capstan is fitted on the after end of the poop deck, with the engine fitted below. The steam steering gear is fitted on the upper deck abaft the engine casing, with connection to the steering stations in pilot house and on navigating bridge, an auxiliary hand screw gear being fitted to the crosshead on the rudder stock, on the upper deck. The propelling machinery is placed aft, and consists of one triple-expansion inverted reciprocating engine of about 1800 I. H. P. and two single-ended Scotch boilers having a working pressure of 200 pounds. The vessel is intended for the coastwise coal carrying trade between Baltimore and Boston. The "Jonancy" is a sister ship of the "Virginia," now being completed for the same company.



The Pilot Schooner "Adventuress," which has just been rebuilt after being badly damaged by fire. The auxiliary power is an 80-horsepower Frisco Standard engine.

Rebuilding the "Adventuress"

By R. Z. DICKIE.

ON July 6 of the present year, the auxiliary pilot schooner "Adventuress" took fire at Sausalito and was completely burned out on the inside before being pumped full of water and sunk by the San Francisco fire tug "Dennis Sullivan."

The "Adventuress" was formerly owned by Mr. W. E. Borden of Chicago, and was built for him in Booth Bay, Maine, in 1913, and came around the Horn, being joined by her owner and a party of friends who made a hunting trip in her to Alaska, after which she was bought by the San Francisco Bar Pilots' Benevolent Association and was in their service about ten months when she was burnt. She was designed by B. B. Crowenschild, of Boston, Mass., and is 78 tons gross and 52 tons net. She is 88.5 feet long by 23.4 feet beam by 9.8 feet deep, with a 101 length over all. Her power plant at that time was an 80 horsepower San Francisco Standard gas engine, which was shipped east and installed in the boat and made the trip around the Horn without a hitch.

When she went into the pilot service her topmasts were removed and her bowsprit cut short, as only moderate sailing power was required, as the engine is used in light weather and at all times when the boat has to be handled.

After being burnt, she was rebuilt at the Union Iron Works of San Francisco, under the direction of Captain W. Wallace, Secretary of the Bar Pilots, and had her trial trip on Saturday, October 24, immediately after which she went into pilot service again. On her trial trip she made a speed of 9.69 miles per hour, her "'Frisco" Standard engine turning 288 revolutions per minute, developing about 97 H. P.

On the test stand her new 80 H. P. "'Frisco" Standard engine, which is 9¾" bore by 12" stroke, gave the following test:

R. P. M.		Power.	Fuel.
250		90.5	The fuel varied from .106
260		92.1	to .103 of a gallon per
270		94.1	horsepower per hour of
280	Rated	96.0	distillate, testing 59 de-

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290	98.0	grees Béaume at 60 de-
300	99.8	grees Fahrenheit. 3"
310	101.6	Schebler, Model "F."

Her electric light plant is driven by a 5 H. P. single cylinder "'Frisco" Standard direct-connected generator set, and she is equipped with a storage battery which will carry her lights for 24 hours without recharging.

The pilots' saloon is aft and contains six berths, with lockers and drawers for each. The washroom is amidship and the toilet aft in the stern. In the extreme bow the crew's quarters are situated, with the galley immediately aft of it, and the messroom is on the starboard side, abreast of the engine.

On deck three dories are carried, which are handled on a "Spanish burton" between the masts.

Present Condition of the Submarine

By MAX A. LAUBEUF, late Chief Constructor, French Navy, Paris, France.

THE difference between the submarine and the submersible are rather differences in mode of construction, reserve of buoyancy and form of body. With the submarine pure and simple, the water ballast tanks are placed inside the boat, which has circular cross sections. With the submersible type, these reservoirs, of much greater volume, are placed outside the hull proper. There results an entirely different mode of construction. The submersible has a double shell. The inner skin, which must resist heavy pressure, is made of thick plating. The shape of the sections is elliptical. The outer skin is made of very light plates. The double hull may be complete or partial.

The ratio of reserve buoyancy to the total volume of the ship immersed scarcely exceeds 13% for the submarine type pure and simple. It is much greater for the boats of the submersible type. The boats built according to my designs have 27% to 33% and the "Narval" had 41%.

It results from this difference that the submarine readily drives into the waves and that on the open sea it soon becomes necessary to withdraw the crew from the exterior and close all openings. The submersible, on the other hand, navigates under such conditions like an ordinary ship.

The submarine is distinguished by circular sections and for many years it has been given a pointed form at both ends. When in 1897 the design of the "Narval" was presented, in which the external form was exactly similar to that of a torpedo boat, many persons expressed the opinion that a boat thus formed would never dive satisfactorily. It has proven, in effect, that the submersible type is as well suited to diving as the other. The most serious objection to the submersible at the beginning was that in order to pass from surface to underwater navigation, a change must be made to the electric motor; and then a considerable amount of water must be taken in to dive and during the time thus required, the boat was in a critical condition, permitting destruction by a ship of the enemy. On the "Narval" at the beginning of the trials, the time required for immersing reached 28 minutes, and the objection noted above was justified. But on this same boat the time was finally reduced to 12 minutes. On the "Sirene" type of 1900 this was reduced to 8 minutes; on the "Aigrette" type of 1902 to 6 minutes, and finally on the submersible of the "Pluviose" type of 1905, to less than five minutes.

The American firm which has built the greatest number of submarines, pure and simple, the Electric Boat Company, has long built boats of small reserve buoyancy. This company is now turning to the submersible type, type M now building having a surface displacement of 1000 tons and a submerged displacement of 1500 tons, a reserve buoyancy of 33%. Finally, this firm, which until 1913, built submarines with a single shell and with water-ballast tanks inside, is now building the new type M with a partial double shell. This is a marked change towards the submersible type.

On January 1, 1914, according to the table published by the English Admiralty, the number of submarines built or building was as follows:

Name of Country.	Built.	Under Way.	Total.
England	69	29	98
France	50	26	76
United States	29	25	54
Russia	25	18	43
Germany	24	14	38
Italy	18	2	20
Japan	13	2	15
Austria	6	5	11
Denmark	6	4	10
Sweden	5	3	8
Holland	5	3	8
Norway	3	2	5
Greece	2	2	4
Brazil	3	0	3
Peru	2	0	2
Chile	0	2	2
Portugal	1	0	1

Submarines have not escaped the tendency towards increase in displacement. Ships which have the torpedo as the sole or preponderating offensive armament do not find much advantage in an increase in displacement. The same remark may be made

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with regard to submarines. Here it may be said that torpedoes form the sole armament, the two small guns which have been placed on certain of these vessels being of very little use, and it will be seen that the offensive power of submarines has increased very little, notwithstanding an enormous increase of displacement. Efforts were made especially to improve the speed and radius of action, both surface and submerged, for the first were quite insufficient in this respect.

To sum up, it will be seen that for submarines, increased displacement provides but a rather feeble increase in offensive power, and that to obtain higher speeds it is necessary to pass to large displacements. On the other hand, large displacements offer the following drawbacks: Greater difficulties of evolution while submerged; too great a draft both submerged and surface. The draft of water on the surface does not allow them to pass in small depths and when submerged prevents them passing under the keel of an enemy's ship. Too large a turning circle on the surface or submerged is another serious drawback. Finally the cost of construction becomes too high. These considerations lead to the conclusion that it is preferable to have two distinct types of submarines.

Defensive or coast-guard submarines will have a moderate tonnage, good maneuvering powers, a small turning circle, moderate draft, and, on account of low cost, can be constructed in rather large numbers. These boats must be well armed, but they need not realize great speeds nor have a large radius of action when navigating on the surface.

This class of submarine must not only defend the coasts, but also take the offensive within a fairly large radius. They must have good armament, excellent nautical qualities and good quarters for the crew, all of which is difficult to obtain with a small tonnage. They must have a high reserve buoyancy. The good sea-going qualities of submersibles with a large reserve buoyancy have been proved by a great number of journeys of long duration made by ships constructed after my plans. In my last construction I augmented the buoyancy, with a view to further increasing the nautical qualities.

The second type of submarine, which it is now sought to realize, is the high seas or squadron submarine intended to accompany the fighting ships in any weather and to take part in naval battles. It is absolutely necessary for this boat to possess high speed on the surface and good speed when submerged; a large radius of action, great offensive power, good nautical qualities and excellent living quarters. These conditions can only be realized with a very considerable displacement. Ships of intermediate tonnage, ranging between the coast-guard and the squadron submarine, are useless; they are too large as coast-guard and too small as high-seas submarines. I include in the number of these ships, which should have never been put down, all of the submarines of 600 to 700 tons on the surface. All these ships represent but half-measures. They can not accomplish much more than coast-guard submersibles of 400 to 500 tons on the surface, they possess too low speed and inadequate nautical qualities to accompany a squadron.

Three types of submarines only approach closely at the present time to the true conception of the squadron type. The French Navy is in the lead; the "Gustave-Zede" and the "Nereide" have 800 tons on the surface, 1100 tons submerged and two others, a little larger, were ordered in 1913 and five in 1914. They have 835 to 1200 tons. In Great Britain the type "F" of 950 to 1200 tons is still on the slip. It is said that a new English type, the "G," ordered in 1914, is 1500 tons submerged. In the United States a new type, "M," is projected. The displacements are understood to be 1000 to 1500 tons. If my information is correct, the program of squadron submarines in France, Great Britain and the United States is similar: 19 to 20 knots on the surface, 11 to 12 knots submerged. Will these types of submarines adequately represent squadron submersibles? I answer without hesitation, no; their speeds on and under water are insufficient. To be able to accompany a squadron it is necessary to have a maximum surface speed at least equal to 22 or 23 knots. I say "at least" because small ships lose much more speed than large ones in heavy weather. It is necessary also to have a submerged speed at least equal to the current speed of evolution of the armored ships and here a speed of 15 knots appears to me an absolute minimum.

What are the reasons which prevent these speeds at the present time? (1) It has not yet been possible to construct very powerful internal combustion motors, which would at the same time have a relatively small weight and size; (2) the double motive power.

To-day we should like to banish the electric battery from the submarine and to place in these boats one motor only. Many attempts have been made in this direction, some with a single internal combustion motor, others with a single steam engine, but no boat with a single motor has solved the difficult problem. When they have given us the powerful, sure motor, with relatively small weight and size the program of the squadron submarine set out above can be realized.

Present tendencies of submarine flotillas appear to be the following: (1) Coast-guard submarines of moderate displacement, 350 to 500 tons on the surface, 500 to 750 tons submerged; with 14 to 16 knots on the surface, 9 to 10 knots submerged; having a reasonable radius of action; having good living quarters; and, finally, with good nautical qualities, and this implies a high reserve buoyancy. (2) Squadron submarines having a great displacement, for example 1200 tons when submerged; having 23 knots surface and 15 knots submerged speed; with powerful armament; a very large radius of action on the surface; excellent quarters; and first-class nautical qualities, implying a high reserve buoyancy.

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Our Merchant Marine and the Loggers

AT THE recent annual convention of the Pacific Logging Congress, Mr. J. J. Donovan, president of that body, made a most interesting and strong address in which he clearly expressed the intimate bearings that merchant marine matters have on the lumber industry. Lack of space prevents the use of the address in full, but the following extracts show that business men are coming to think more deeply and soundly on the international aspects of our possible business expansion. Mr. Donovan said:

We ask for just consideration for both employer and workman and we meet at a time when the trade is suffering from the most severe depression of its history. Many of our most valued members are from British Columbia. Some of us think an unfair tariff has an important bearing on American conditions but we will not discuss this. Others are certain that the Panama Tolls Act unjustly discriminated against us. We will pass that by but there is one subject on which I shall speak as being an important factor in the present condition of the lumber trade and that is the deplorable condition of the American Merchant Marine.

Because we have few suitable ships for the foreign trade on the Pacific many camps are closed, many mills are silent. Legitimate trade languishes because the one conspicuous failure in our economic progress is the development of our merchant marine.

The record is one of economic inaptitude and inefficiency most discreditable to the genius of America. The crowning act of folly was the so-called Seamen's Act which has driven the splendid fleet of the Pacific Mail to the Atlantic and turned over valuable carrying trade to our commercial rivals. I have read with care Mr. Andrew Furuseth's defense of the bill in a recent number of the "Survey" and Mr. La Follette's remarks thereon in his weekly. They remind me of Mark Twain's description of the politician delivering with much earnestness a speech "made up of facts which were not so."

These gentlemen are obsessed with the idea that the press, the Chambers of Commerce and the business world of the United States are engaged in a conspiracy to oppress the sailor, to drown the passengers and to enrich a few shipowners. That the Sailors' Union should in the name of safety secure provisions adding greatly to expense and oppose and prevent amendments securing efficiency and at the same time break treaties with more than a score of nations is a matter of record. Our flag is already gone from our few important ships on the Pacific; it will go from those on the Atlantic when the stress of war passes.

We may build up a lake and coastwise marine no matter how onerous the legal handicap by the simple expedient of shutting out all foreign ships. That we have done, but on the world's highway we have trimmed our sails to every political breeze and our ships are water-logged. The protests of men who knew, like J. J. Hill, R. P. Schwerin, J. C. Ford, Robert Dollar and W. E. Humphrey passed unheeded and the slow upbuilding of years has been blasted in a few months. Let me quote a few words from Hon. Wm. E. Humphrey, one of the ablest opponents of the bill:

"The enactment of this law was almost a crime. It injured American shipping and American industry without in any way benefiting any American interest. It was the crime of cowardice and not of ignorance. It is no longer prophecy as to what the effect of this law will be on American shipping. We know. All American vessels have been or will be driven from the high seas. This law has made Japan's control of the Pacific complete. It has driven the American vessels from that ocean, forced from the sea the few American officers and sailors remaining and left us without a single ship fit for a transport or naval auxiliary. Not 5 per cent. of the Sailors' Union were born in this country. They want the United States to secure favors for them that their own lands will not give them and still they do not think enough of this country to become American citizens. The Stimson Mill Company at Ballard, up until a few days ago, had one customer that bought of them for the foreign trade $100,000 worth of lumber each month. This customer has just notified the Stimson Company that hereafter his purchase will be made in British Columbia, where he can use ships to carry his cargoes that are not subject to the Seamen's law. One mill alone in the State of Washington loses the sale of $1,200,000 worth of lumber because of the Seamen's law."

Our British Columbia cousins are to be congratulated but what must they think in their hearts of America's vaunted business sense. Mr. Takiwaki, a Japanese manufacturer says that this act is "Something the Oriental mind cannot comprehend" and neither can the Occidental.

No self-satisfied contemplation of American flags on Atlantic shipping, placed there under the stress of war and largely on ships drawn from our own Great Lakes and coasting trades can hide the sinister fact of the destruction of American shipping on the Pacific. Let no grandiloquent boasting of dreamer or demagogue deceive you. Our flag is gone from the Pacific. It will go from the Atlantic

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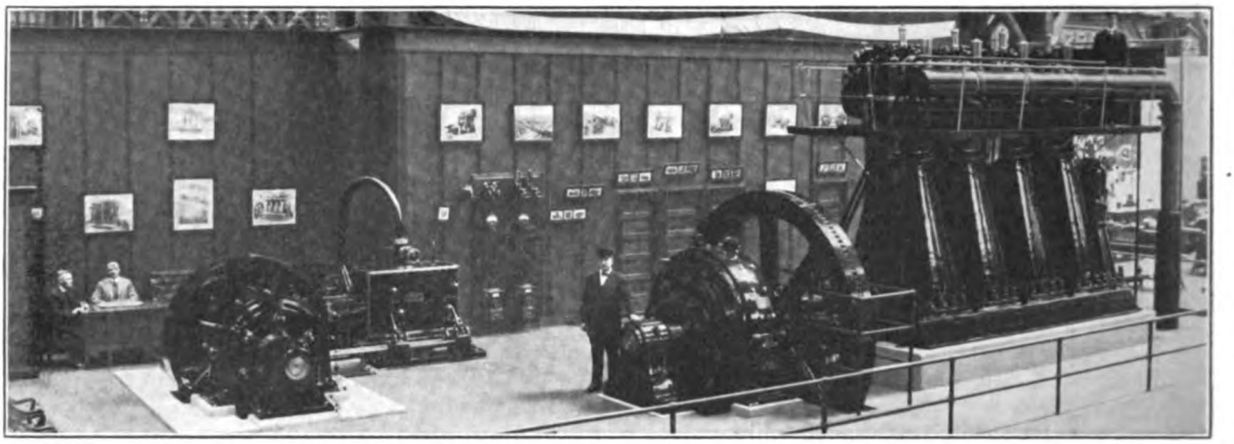
A message from the sea. Courtesy of Portland Oregonian.

as soon as the great war ends unless we radically change our laws along lines which will enable us to compete with the fleets of maritime nations.

It is time to listen to the business men of the nation and relegate the doctrinaire to the rear. Private ownership and initiative will solve the problem if given a fair field. Adopt the rules of the British Board of Trade for the protection of passengers and crew, of the admiralties of England and Germany modified to suit our conditions for the creation of a naval reserve and of the postal departments of those countries for developing trade. Senator Burton says our postoffice makes between two and three millions annually on our over-sea service. It should be ashamed of itself. "Save at the spigot, waste at the bunghole" is a homely proverb but it fits. No wonder South American trade goes to Europe when letters pass on the average in half the time required for the United States due to the superior European shipping facilities.

The genius which built the Panama Canal will rise superior to the croakers and the craven and build for us a national navy second in defensive power to none and able to protect our merchant ships on the seven seas. To secure those merchant ships we must look to our citizens and not to the Government except as it gives support by laws equally favorable with those of our competitors. For these policies I bespeak the support of all good Americans and the early restoration of our lost mercantile marine.

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The big engine of the McIntosh & Seymour Corporation was one of the commanding exhibits in the Machinery Palace.

Mechanical Engineering at the Exposition

By GEORGE W. DICKIE,
Vice-President American Society Mechanical Engineers.

THE first thing that the mechanical engineer observes on entering the Palace of Machinery at the Panama-Pacific International Exposition is the entire absence of the steam engine. There is not a steam engine of any kind in operation, nor a steam boiler under steam. On first thought the engineer might take this as evidence that the steam engine had reached a stage of innocuous desuetude and had ceased to rank as the greatest machine the mechanical arts had produced. On second thought, however, he would have to admit that, of all the power developed by the combustion of fuel, more than 90 per cent. is developed in the cylinders of steam engines or the rotors of steam turbines. His third thought would probably bring him to the conclusion that the steam engine had reached that stage of development when no striking improvements can be looked for.

The fact that California is a great fuel oil producing State may be one reason why the steam engine forms no part of the machinery exhibit, yet the great bulk of California fuel oil is consumed under boilers.

The separate generator and condenser, the crowning achievements in the early days of steam engines, are, in these days of quick returns, considered antiquated; and, acting on the principle that there is no time to be lost in dealing with heat, we are now advised to burn our fuel as rapidly as possible in the engine cylinder, to get the power out of it instantly and let it go—hence the internal combustion engine.

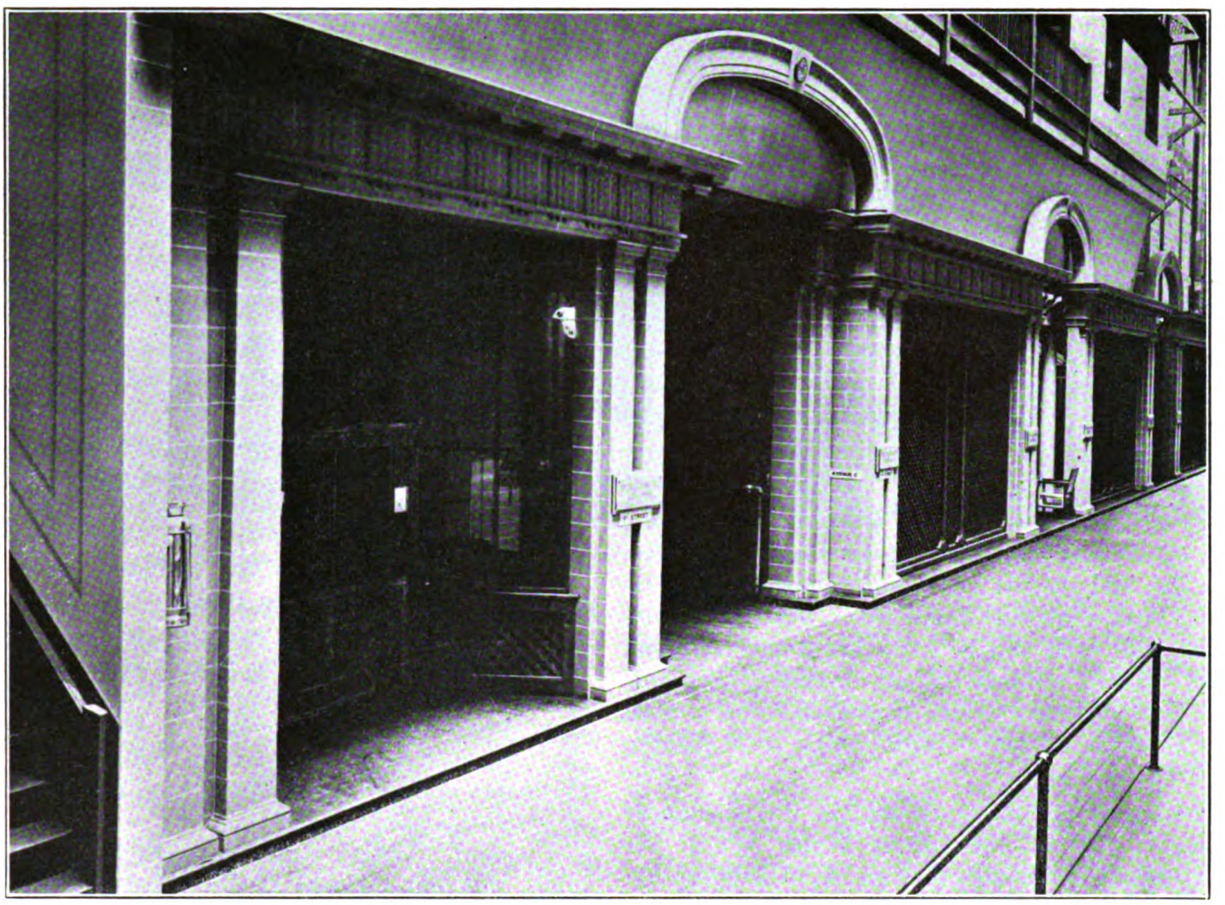
There is quite a display of gas engines and these may be classed as: (a) Marine engine, Otto type, constant volume class, for distillate fuels such as gasoline and kerosene. In this class there are some fine exhibits, such as the Standard Gas Engine Company's, showing a good line of well designed and carefully finished engines from 100 horsepower down. The Union Gas Engine, shown cut open to illustrate the piston and valve gear, is a fine type of marine gas engine. The C. L. Seabury Company also shows interesting examples. The Van Blerck Motor Co. exhibit some handsome engines of attractive design, which present new features. The Imperial Gas Engine Co. have an exhibit of substantial looking engines while others in the same class such as the Buffalo Gasoline Motor Company, the Wisconsin Machinery and Manufacturing Company, the Loew-Victor Engine Company and the Waterman Marine Company are all well worthy of study.

(b) Marine engines, Otto type, constant volume class, with injection for heavy oils. Of this type there is but one example, that of August Mietz. It is a well-designed and strongly built engine.

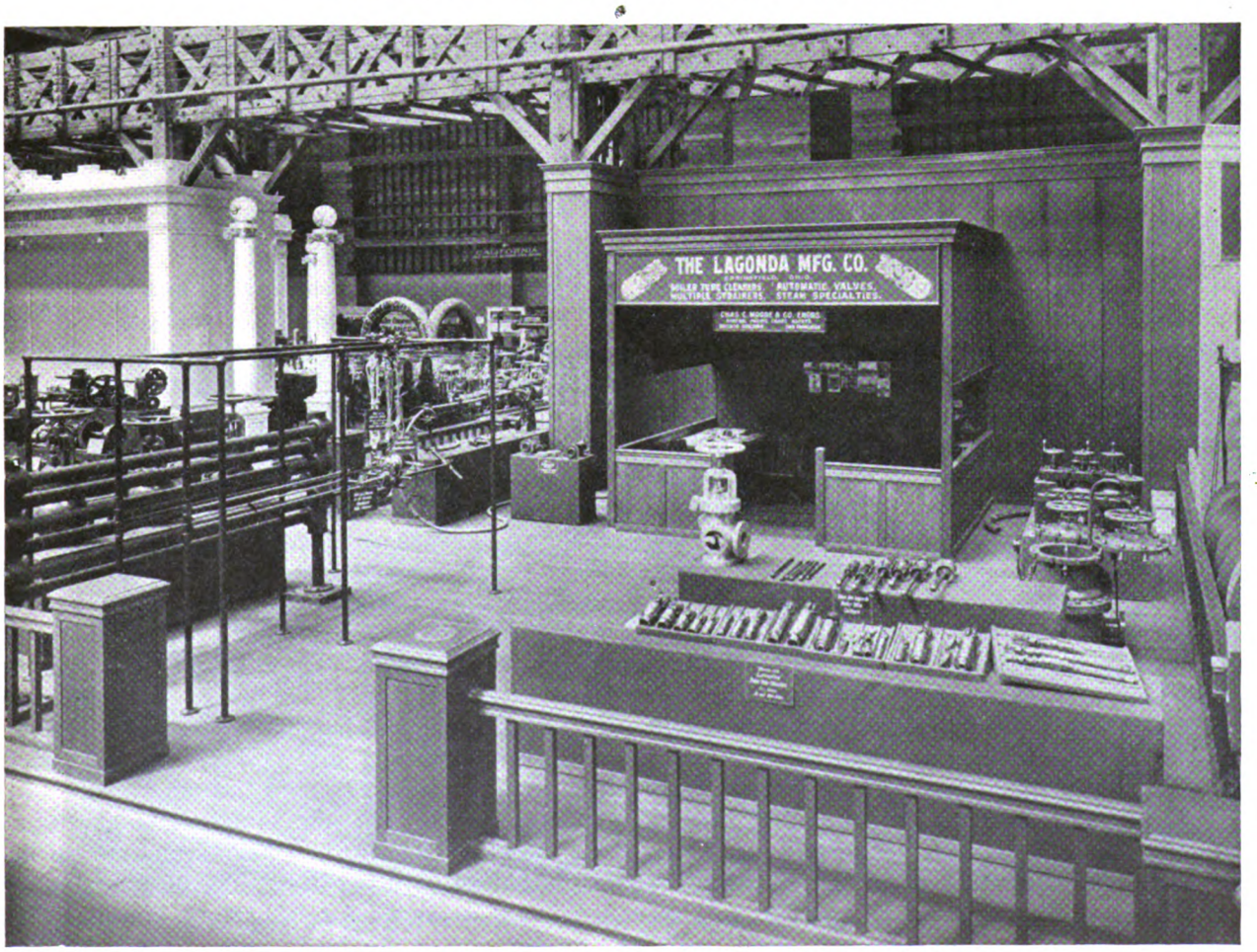
(c) Marine Diesel oil engines. In this class there are two exhibits—that of the New London Ship and Engine Co., and that of the Fulton Manufacturing Co. The first named works under a load of about 80% of full power, the normal being 200 h.p. These engines illustrate the present state of the art in Diesel engines of moderate power.

(d) Stationary engines, Otto type, constant volume class, for distillate fuels. Of this class a great variety is shown. Mention might be made of the exhibit of the International Harvester Co. There is a rich field in this exhibit, which gives information as to the best way to hitch up a gas engine to almost any kind of work. The Western Gas Engine Corporation exhibit stationary engines which present some features worthy of study. These engines have an unusually long stroke for gas engines and were the first to introduce water into the carburetor. The valve gear is very simple, with free moving parts operated by a rod from a single

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Front of the attractive exhibit of the Otis Elevator Company.



Booth and attractive exhibit of the products of the Lagonda Manufacturing Company.

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eccentric. The Doak Gas Engine Co. and the Bessemer Gas Engine Co. show some good work under this class.

(e) Stationary engines, Otto type, constant volume class, with injection for heavy oils. Under this type some good exhibits are shown, notably those by August Mietz and the Bessemer Gas Engine Co.

(f) Stationary engines, Otto type, constant volume class for gaseous fuels. There are two exhibitors, the Standard Gas Engine Co. and the Western Gas Engine Corporation. As the arrangement of valve gear of these engines is quite different in design and function, they offer a good opportunity for comparison.

(g) Stationary Diesel oil engines. There are two exhibitors, the Busch-Sulzer Bros. Diesel Engine Co. and the McIntosh and Seymour Corporation. Both show fine examples of vertical engines of 500 h.p. each and both illustrate the best that these makers produce. Each engine is operated with Star distillate, which is probably the nearest to California crude oil with which it is safe to work these engines.

The most impressive exhibit in the machinery palace is that of the Pelton Water Wheel Co. This exhibit, covering every phase of rotative hydraulics and hydraulic control, can be divided into two parts: Operating division, and display division.

The operating division consists of two sections: (a) A high head pumping project combined with a high head hydroelectric development where water economy is important, and employing tangential water wheels. (b) A deep well pumping project combined with a medium head hydroelectric development, employing mixed flow turbines.

The high head pumping plant consists of a Pelton-Doble turbine pump, driven through a flexible coupling and herring-bone speed increasing gears by an internal combustion engine. The high speed shaft of these gears turns at 1800 r.p.m., the efficiency of transmission at full rated load of 150 h.p. being in excess of 98%.

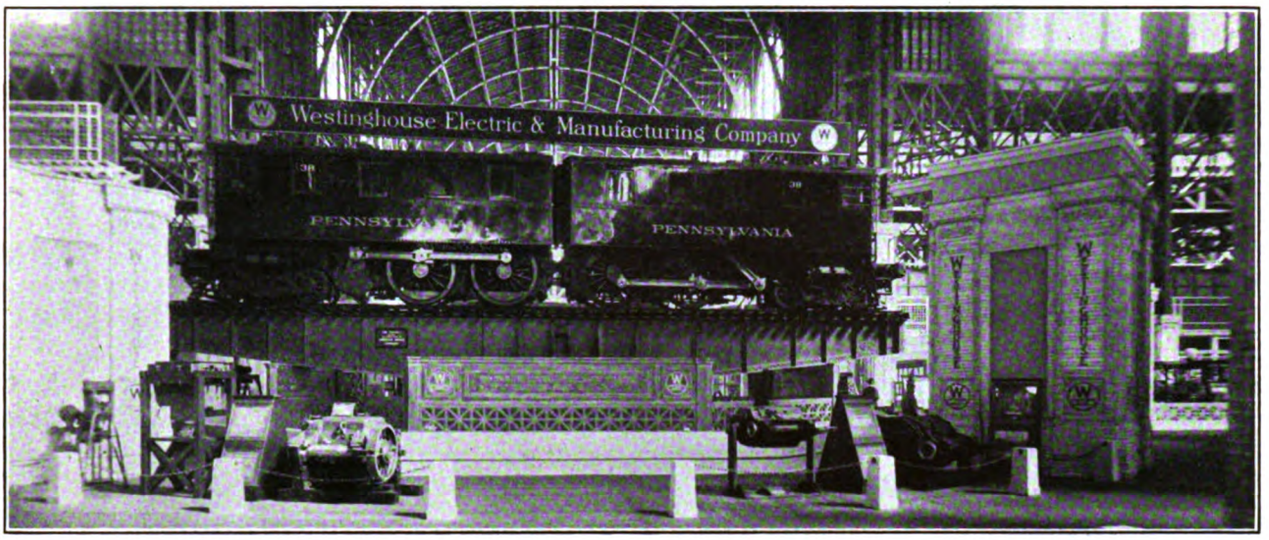
The engine is a 6-cylinder, vertical type, developing 180 h.p. at 350 r.p.m. It uses heavy oil up to 18 deg. Beaume for fuel and operates on the 4-stroke cycle with maximum compression not exceeding 450 pounds. No ignition difficulties are experienced with this low compression.

The pump is a single stage uni-diffusion type, having a capacity of 1100 gal. per min. against a head of 300 feet. The impeller of the closed non-overload type, hydraulic balanced and made of bronze, is overhung. The discharge line connects to a Pelton-Doble tangential unit, rated at 100 h.p. under 300-ft. head and operating at 300 r.p.m. This unit is of the single overhung, two-bearing type, with the armature of a 75 kw., 250 volt engine-type direct current generator carried between the bearings, and a flywheel overhung on the shaft and opposite the runner. The entire unit is mounted high and fitted at the water wheel end with a large window which permits examination of the jet and bucket action.

The water wheel disc is steel, with elipsoidal bronze buckets, saddle mounted. Water from the high pressure pump is applied through a needle nozzle, governed by an oil pressure tight governor mounted on the nozzle casting, and actuating the needle directly through suitable link and rockshaft. An auxiliary relief needle nozzle avoids excessive pressure rise in the pipe line and minimizes water waste during governing cycle. The needle of this nozzle is connected to a spring-controlled oil cylinder known as the cascade cylinder. Ports, adjustable from the outside of the cylinder, determine the time element of piston travel. The same link and rockshaft system that actuates the main needle nozzle is connected to the piston of the cascade cylinder, the relative motion (and thus the nozzle area) being equal and opposite in direction when the time element of the cascade cylinder is zero. With this setting, the auxiliary nozzle merely acts as a synchronous bypass, and the water quantity is constant. Where water economy is of importance, the time element of the cascade cylinder is so adjusted that a rate of closing of the main needle which does not raise the surge pressure to a dangerous point will not open the auxiliary needle. Higher closing rate opens the auxiliary needle, which is then returned to closed position by the compression springs of the cylinder mounting at a rate that will not cause dangerous surge pressures. This is the position of maximum economy. A baffle plate, employing the vortex principle, is set in the casing and receives the impact of the relief stream, quenching its energy.

The deep well pumping plant consists of a Pelton-Doble bore-well type turbine pump, with a capacity of 4500 gal. per min. against a head of 60 feet and driven at 1760 r.p.m. by a vertical motor mounted on the pump pedestal. The maximum diameter of the pump is 22½", permitting its easy entrance into a 24" bored well. The discharge orifice is 14" dia., and has bolted directly to it, a riveted steel pipe line leading to a Pelton-Francis turbine. This unit operates under a head of 50 ft. and develops 50 h.p. at 1400 r.p.m., an unusually high specific speed. The runner is balanced and is of the Francis type. The wicket gates are controlled by a self-contained governor, which actuates a water economizing cascade relief valve as well. The principle of operation is the same as the governor employed with the tangential unit, except that an oil reservoir and belt driven pump are placed on the governor base. The entire operating division is arranged for laboratory investigations,

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The Westinghouse electric locomotive on the turntable dominates the Transportation Building.

and more than 800 tests have been conducted by independent engineers and the staff of the Pelton Water Wheel Company.

The display division may be divided into four sections: Francis turbines, tangential, governor and miscellaneous. The central feature of the entire exhibit is a Pelton-Doble single, overhung runner, single discharge turbine, rated at 20,000 h.p. under 500 ft. head, at 360 r.p.m. The entrance valve, casing, draft tube and governor are assembled complete; the runner, of bronze with steel hub and forged wearing rings, and fitted with leakage evacuators, is displayed on a separate pedestal. The main valve, of the butterfly type, is 66″ internal diameter, with body of annealed cast steel.

The tangential section may be divided into two groups: hydroelectric prime movers and water motors. Two runners, each rated at 10,000 h.p. under 1350-ft. head at 360 r.p.m., are displayed. These are of the chain connected type, with ellipsoidal cast steel buckets. The jets for these units are 7″ diameter, and are projected from deflecting needle nozzles with motor operated manual controlled needles and governor controlled deflection. One of these nozzles, assembled complete with motor, and three needles, pedestal mounted, are displayed. A single bucket of the chain connected type, taken from a wheel rated at 14,000 h.p. under 870-ft. head at 200 r.p.m., is also displayed.

In the governor section are displayed a group of self-contained oil pressure type governors, of 5000 ft.-lb. draw bar effort, and, in conjunction a standard mounted tangential unit, an enclosed type of oil pressure governor having a draw bar effort of 80 lbs.

The miscellaneous section includes a display of hydraulic giants of the type employed in placer mining and hydraulic fill construction.

The exhibits of machine tools are not very numerous and, outside of two very notable exhibits, there is nothing in this line that requires the attention and study of the mechanical engineer. Be-



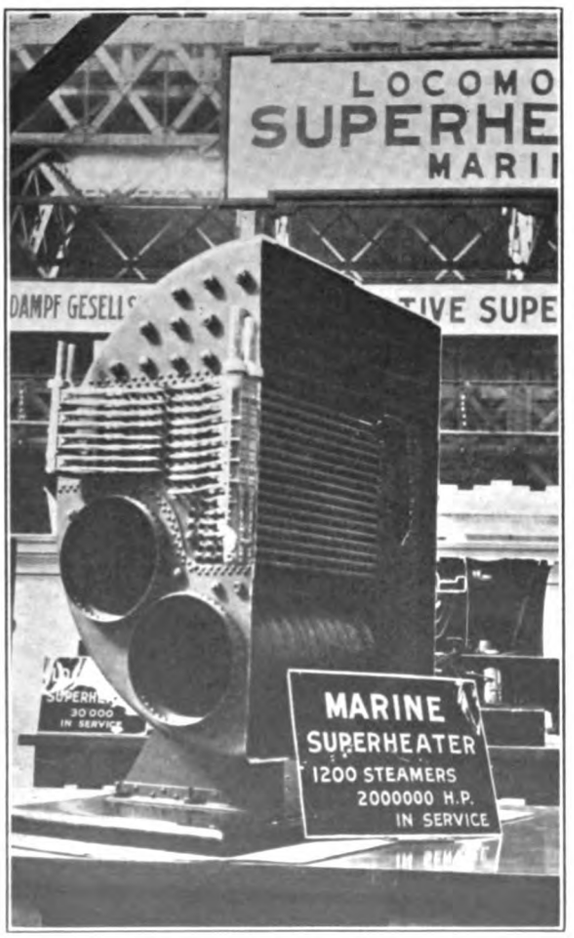
The Imperial Gas Engine Company displayed a fine line of marine units.

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The Locomotive Superheater Company's exhibit.

fore examining the machine tools it would be well to inspect the exhibit of the Tinius Olsen Testing Machine Company, as the records produced by such machines form the foundation work for all modern machine tool design. Here the observer will find the universal testing machine and instruments, spring testing apparatus, cement, concrete and road material testing machinery; cloth, yarn, paper, rubber and leather testing machines; oil testing machines, transverse testing machines, and special testing machines, including impact, indentation, vibration, bending, hardness, endurance, torsion and efficiency testing.



A section of a Scotch boiler showing the application of superheaters.

The engineer should not fail to notice the splendid automatic and semi-automatic tools exhibited by the Warner and Swasey Co. Ten tools are shown in operation, several of them being of new design. Their new universal turret lathes are powerful tools and have some remarkable features. Because of their strength and rigidity and the fact that each carriage with its independent feeds is able to operate simultaneously, the lathes produce a very large amount of work. They have equal facilities for both bar and chucking work. As many as 11 cutters may be used in the turrets and carriages of these lathes, all cutting at the same time and in one set up.

The Warner and Swasey Company's exhibit easily leads all other displays of machine tools at the Exposition. The two hollow Hexagon turret lathes, prominently shown in the illustration, are widely used by shipbuilding firms both in this country and abroad. The many pieces of duplicate work encountered in shipbuilding are readily handled on a tool of this nature and, in addition, a wide range of regular lathe work can be handled to advantage. As on an engine lathe work may be turned between centers. Bronze bearings, pump fittings, studs and special bolts as well as large valve parts are regularly machined on the hollow Hexagon turret lathes and the No. 4 Universal Turret Screw Machine in the largest shipbuilding plants in the country. There is an automatic boring and tapping machine for machining plumbers' fittings and other parts having two ends to machine which is of particular interest to yards building submarines. This machine is semi-automatic in operation, having four live spindles which automatically approach the work and return,

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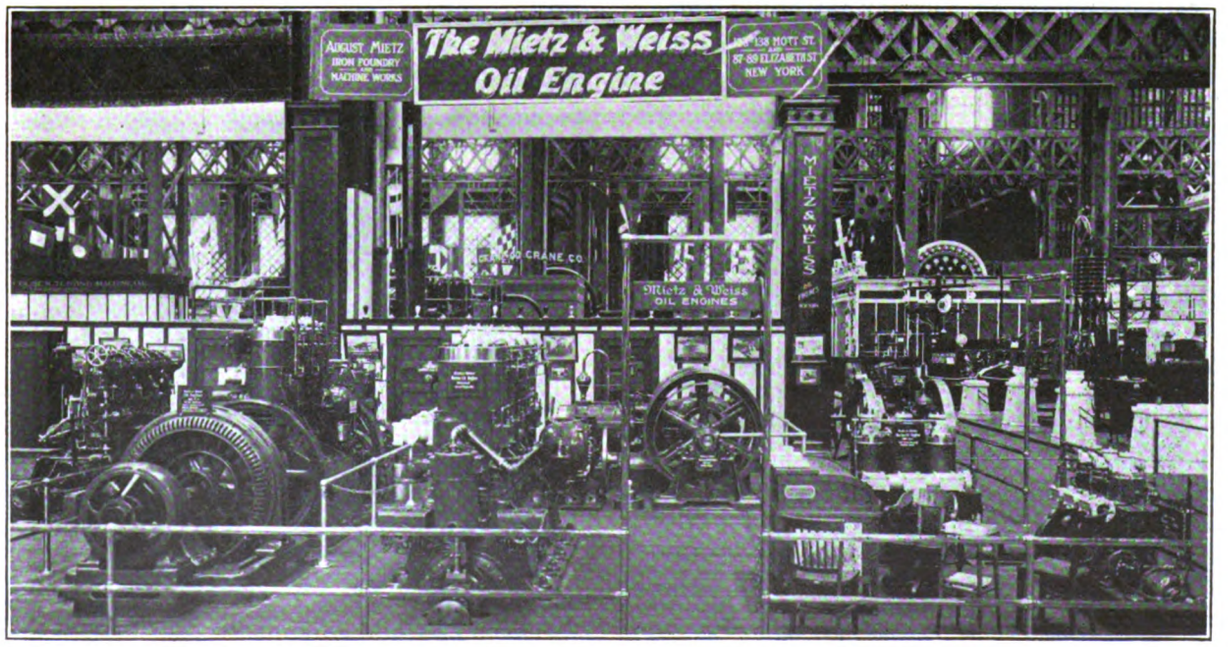
The splendid machine tool display of Warner & Swasey was one of the features of the Machinery Palace.

boring and tapping both ends of the fittings while the operator is placing a third fitting in the free corner of a triangular chuck. Twenty-five hundred two-inch brass fittings are machined in this tool in nine hours.

Other tools exhibited by this company belong to their line of screw machines and plain turret lathes and are all characterized by the same scientific design and careful workmanship. The automatic boring and tapping machine is also shown in operation. This machine finishes unions as fast as the operator can put them in the chuck, and an average of 3500 one-inch unions are turned out in a day of 9 hours. The Warner and Swasey exhibit will be acknowledged by all engineers as the principal factor in redeeming the machine tool display at the Exposition from being classed as an ordinary exhibit.

Another exhibit that has given character to the display of machine tools is that of the Morton Manufacturing Co. This is an exhibit of draw-cut shapers, traveling-head planers and key-seating machines. The draw-cut type lends itself to heavy cutting to a remarkable degree. The whole stress of cutting draws the work solidly and directly against the face of the main casting of the machine and eliminate stresses from the table rail or the upper bolts as in the usual type of shaper; the tool arm or ram is under tensile stress in cutting, which tends to eliminate vibration; when the ram or arm is in compression, the heavier the cut the greater the danger of vibration. There is an adjustable back bearing which forms a stop to the end of the vise when planing parallel with the jaws. As the drawing cut overcomes vibration, it is possible to make forming tools to be used in these machines at a moderate cost. Cutters can also be used for machining parallel openings, cutting down both sides at once.

In the exhibit of Fred Ward and Sons there are



The Mietz & Weiss oil engines attracted a great deal of attention at the Fair.

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shown some very good machine tools, notably those of the American Tool Works. The engine lathes shown are well constructed modern tools with easily adjusted feeds and with speeds adapted for electric drive. A shaper and a planer of good design and strongly built are also shown. The radial drilling machines shown by the same company are of good design and well built; they are also well balanced as shown by the absence of vibration working at high speeds.

In the extensive exhibit made by the Crane Co. is a motor-driven pipe-threading machine having two unusual attachments—a quick centering rear chuck and compressed air cutting-off tools.

The York Manufacturing Co. exhibit a complete refrigerating plant in operation, keeping cold several chambers. This company is one of the largest makers of this class of machinery and on that account the writer expected a finer display. What is shown, however, is good.

The exhibit of a complete plant by the Vulcan Iron Works will be found very interesting. The refrigerating chambers are a part of the exhibit and, being of glass, show the splendid condition of the foods inside, there being no sign of dampness on the inside of the glass or on the products contained. This exhibit is a first-class illustration of the refrigerating process and affords valuable information.

The Automatic Refrigerating Company exhibit a complete automatically controlled plant. This control is a decided advance step on new ground; it automatically stops the machine when the refrigerating room temperature falls one degree below that for which the machine is set and starts it again when the temperature is one degree above that point. This regulation also applies to any number of chambers working at different temperatures. It is noted that during the cooler parts of the night the machine runs about four minutes and stands about 15 minutes very regularly.

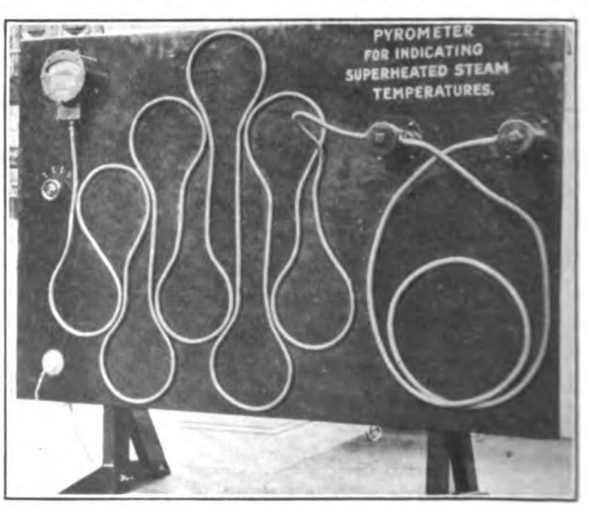
The exhibits of lubricating oils made by both the Union and Standard Oil Companies show real achievement in petroleum technology and both companies deserve great credit for their scientific development of lubricants from California crude oils. The California oils show certain superiority that merits special recognition. This refers largely to the low cold tests of heavy lubricating oils.

The economical handling of materials is illustrated in the working exhibit of the Shephard Electric Crane and Hoist Co. This consists of electric power cranes and hoists for use from one or two overhead supports; also an electric winch, monorail track and electric controllers and switches adapted for hoisting apparatus. The mechanism is well protected against dust and grit. The monorail consists of two hard steel T-rails bolted to the lower flange of a standard I beam without mutilating it; the strength is thus increased and wear on the supporting beam avoided. The General Electric Co. shows a complete self-propelled electric truck on which is mounted an electric crane; this is demonstrated in operation and is an attractive and instructive exhibit.

The Luitweiler Pumping Engine Co. exhibit pumps of two different types adapted to surface, deep well or hydraulic work. In place of the usual crank shaft operating through connecting rods, there are eccentric or heart-shaped cams working on rollers to produce the motion for the pump ram or bracket. The motion transmitted to two or more pump rods may be arranged to give a non-pulsating constant discharge of liquid. The surfaces of the cams are hardened as well as the rollers; and little wear need take place.

The Locomotive Superheater Company of 30 Church street, New York City, have been exhibiting a fire tube marine superheater at their booth in the Palace of Machinery, Panama-Pacific International Exposition, since the fair opened on Feb. 20. This arrangement consists of header or collector castings and a series of units. The headers are conveniently arranged in the breeching, while the units extend back through the boiler flues, each unit taking in a series of four tubes.

The steam coming from the boiler passes through the steam pipe to the saturated header from where it circulates through the system of units extending through the boiler flues and is delivered to the superheated header from where it passes on to the engine or turbine. The gases generated in the firebox passing out through the flues, reheat the steam on the inside of units. In this manner 200 degrees of superheat is obtained very nicely which makes it a very economical proposition in both fuel and water consumption. By the use of this degree of superheat the boiler capacity is increased to such an extent and the economies in fuel and water are such as to make it possible to decrease the boiler space as well as bunker and tank space on a ship which means an increase in cargo space. This arrangement does not prevent rapid and thorough cleaning of



The Pyrometer for indicating superheated steam temperatures.

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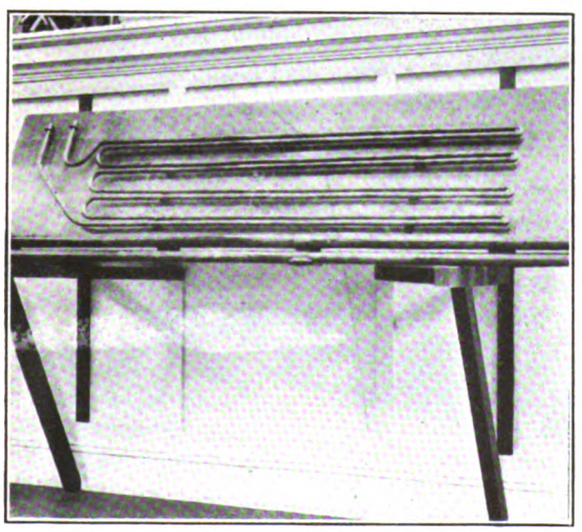
The attractive booth of the Safety Car Heating and Lighting Company.

boiler tubes and its construction provides easy access to all screwed joints as well as the easy removal of the parts. The maintenance cost is also reduced by the prevention of water hammer, leaky flanges and condensation in the cylinders.

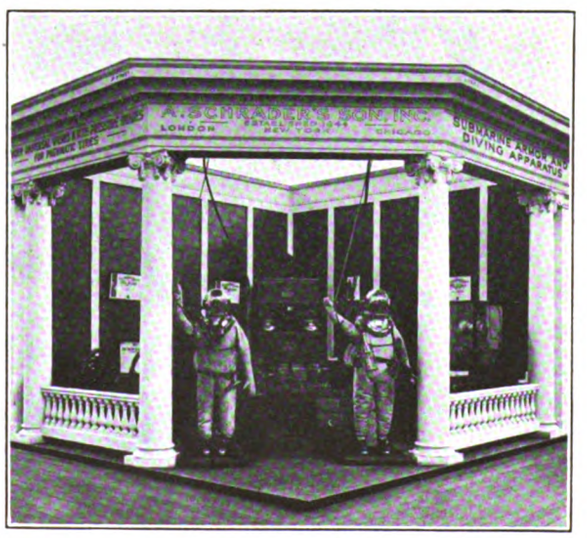
This equipment at the present day is in service on over 1200 steamers involving a total of over 2,000,000 indicated horse-power. The economies effected run between ten and twenty per cent. over the siturated boats of the same proportions. The system of superheat as invented and used by this company is such that the degree of superheat can be controlled by the engineer; that is, any degree of superheat can be obtained from zero to 200 degrees which makes it a very attractive proposition both for turbine and reciprocating engines. A pyrometer is furnished with each boiler having this equipment so that the engineer can see at all times just how many degrees of superheat he is using and regulate his plant accordingly. The material that enters into the construction of this equipment is all passed by the United States Steamboat Inspection Bureau and the workmanship is strictly first class in every respect. This equipment was shown applied to a model of a four furnace Scotch marine boiler, also a full size unit was displayed attached to a board, and the pyrometer was connected up to a electric heater and demonstrations were given to anyone who was interested.

A gold medal was awarded this equipment by the international jury of awards at the P.-P. I. E. and is well worth the earnest consideration of all steamship owners.

In the matter of safeguarding life and property at sea great strides have been made during the past twenty years and no class of safety device has been more markedly improved than the light and sound signals for warning a vessel of its approach to a harbor, headland or shoal. No firm has been more zealous in applying the latest scientific and chemical discoveries to this important work than the Safety Car Heating and Lighting



A superheated coil. Locomotive Superheated Co.'s exhibit.



A. Schrader's Son Inc. exhibit.

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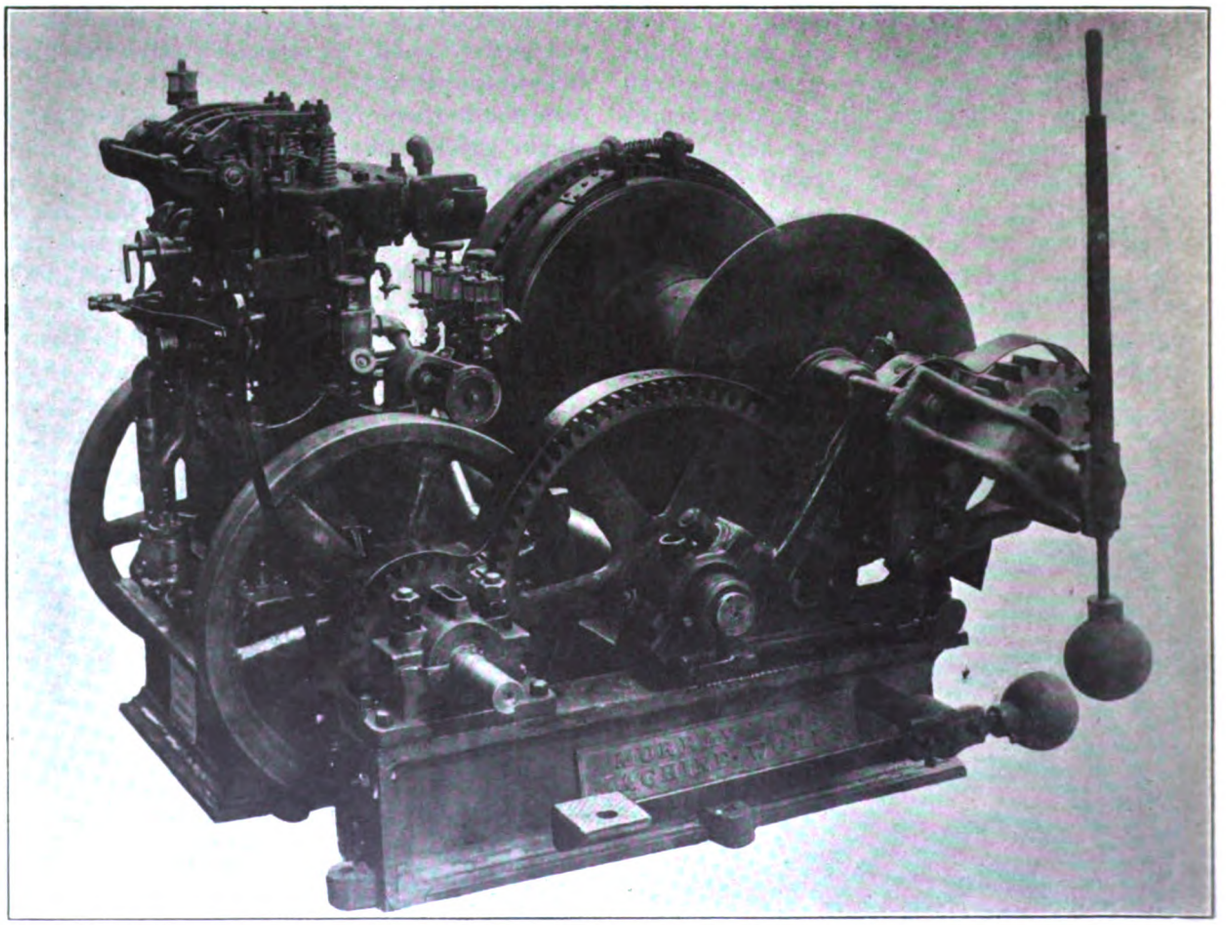
Company. While the name of this firm would indicate that its activities were mainly devoted to the problem of efficient lighting of transportation vehicles on land, its entry into the marine field has proved of great benefit to the mariner.

The Safety Car Heating and Lighting Company have a compact and artistically arranged exhibit at the Exposition, where two of the latest types of Pintsch Gas Lighted buoy lanterns are shown. These lanterns are fitted with submarine bell attachments which greatly enhances their usefulness, the submarine bell being more and more widely adopted as a means of locating points in thick weather.

The exhibit also contains an axle-driven equipment for car lighting. Power for operation is supplied through a Westinghouse motor.

A. Schrader & Son of New York, manufacturers of diving apparatus of all types, have a very unique exhibit in the Palace of Liberal Arts, as shown by the accompanying picture, which is daily proving a source of interest to throngs of spectators. A considerable amount of interest toward this exhibit is caused by the recent sinking of the United States submarine "F-4." At this booth visitors are shown by means of a small diving tank just how air is provided for divers at work below the water level. A bust of a diver is in the tank and the air lines supplying the fresh air and carrying off the foul air are in actual operation, a pump being operated at the surface by an attendant. There are also shown the diver fully rigged in his submarine costume, air pumps of all sizes for varying depths and various other interesting apparatus. This exhibit was awarded the Grand Prize. Just previous to the departure of the U. S. S. "Maryland" for Honolulu with apparatus to be used in the work of raising the "F-4," the Foard-Barstow Ship Chandlery Co., local agents for Schrader & Sons, received a rush order for 1000 feet of air hose. This order was promptly filled from the large stock constantly kept on hand, and it was used in connection with Schrader & Sons' apparatus by the navy rescue workers. In the last year the local agents report having sold numerous diving outfits for use in abalone fishing along the southern coast and in mining operations in the Feather river district, in the northern part of California and in Oregon.

In the Palace of Transportation, the progress in that field of engineering can be traced through all its stages. From the great exhibit of the Westinghouse Company as a center, wherever one turns new wonders of mechanical genius continually arrest attention, and the skill that has conquered the land, the sea and the air, all help to raise the engineer's estimate of the worth and dignity of the profession to which he belongs.



The interesting ship's winch arrangement on the "Snow & Burgess." The engine is an Imperial Gas Engine and the winch is by Murray Brothers, which firm made the installation.

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A Unique Deck Power Installation

The five-masted schooner "Snow and Burgess" was formerly the square full-rigged ship of the same name and of the class of vessel formerly trading between Atlantic and Pacific ports, being propelled solely by sail power and worked entirely by hand labor. When the vessel was bought by San Francisco owners a steam donkey engine was installed by Murray Brothers, of San Francisco, having double cylinders 7" by 12" and of more than sufficient power to handle everything in regular trades. Later the rig of the "Snow and Burgess" was changed to that of a bark and again to that of a five-masted, bald-headed schooner, her present rig. The sails on such a rig are very heavy and the great height of mast gives a long hoist, the work, in fact, being too great for the reduced schooner crew. The depth of the vessel's hold, about 24 feet, also makes the problem of handling pumps with a small crew difficult.



The "Snow and Burgess," a vessel known all over the world.

While the vessel was trading up and down the Pacific Coast, steam was kept on the donkey boiler all the time in winter and practically all the time in summer, this being possible, as fresh water and fuel could be had right along. On her last deep water voyage from San Francisco to Australia and return, however, it was found that sufficient fresh water could not be spared from the supply on board to raise steam and, as before stated, hand power was not sufficient to take care of the sails in bad weather, and on this account some good canvas was lost. Another trouble with the donkey boiler is that it takes too long to raise steam from cold water to be of much use in handling sails in bad weather, when help and power are needed instantly to be effective.

As a remedy for the troubles mentioned above it was decided to install a gasoline engine, as shown in the illustration herewith. Ready-made gasoline engines can be purchased and installed on a vessel's deck, the machinery being self-contained on a single bed plate. Such an installation was considered, but rejected, as it was not deemed efficient for the work required. As the vessel had a steam donkey engine installed by Murray Brothers many years ago and still giving perfect satisfaction, it was decided to let this firm undertake to place gasoline power behind their steam gearing, and the result is the compact arrangement shown in the photograph herewith. This machinery is housed in a solid deck structure a little abaft of amidships, will start at once and furnishes ready power to hoist the sails. As a cargo hoist it is capable of handling about 1,200 pounds on a single fall, it handles the big ship's pumps and, up to the limit of its horsepower, answers all the purposes of the steam donkey engine.

It would appear that a ready and efficient power like this should be a good insurance on a vessel of this class and, in fact, on any large sailing vessel. All are governed by the same conditions and have the same troubles more or less according to their size. In some cases, where vessels were leaking on long voyages, salt water was used for steam, ruining the boiler, though often saving the vessel. If one large sail can be saved by having this ready power at all times its presence is justified, as it would not take many sail losses to make up the price of the gasoline ready worker.

Lee and Brinton have been selected to draw up plans and specifications for a small ferry boat for Seattle service.

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Our Deep-Sea Problem

THE October quarterly of the Journal of American Society of Marine Draftsmen contains a highly interesting article on "The Merchant Marine," by William Gatewood, Naval Architect of the Newport News Shipbuilding and Dry Dock Company. Mr. Gatewood expresses the southerner's viewpoint and takes up the matter from a somewhat different angle than is usually followed by business or professional men writing on this all-important subject.

Mr. Gatewood states the question admirably in his opening paragraph, as follows:

"The merchant marine is an international as well as a national subject. The important questions to settle are whether the sea-borne commerce of a country should be carried by foreign vessels or by domestic vessels; and if by domestic vessels, what sacrifices should be made by the country at large for the encouragement of its merchant marine."

After reviewing the methods used by the early American colonies to distribute equally the burdens entailed by differential duties which raised the price of certain commodities, but made the American ship supreme in her own carrying trade and describing the manner in which the British secured the whale oil trade from the Dutch when whale oil was most essential to the welfare and comfort of mankind, Mr. Gatewood proceeds to demonstrate just where a nation's losses or gains appear when that nation carries her own goods or hires others to attend to the transportation.

The greatest advantage of the carrying trade, however, is probably the profit which it yields to the country which engages in it. Let us suppose that the average cost to an English vessel for carrying a ton across the Atlantic is $10.00, and that the charge is $12.00 per ton, a profit of $2.00. There will be no question in this case of where the profit comes in. Suppose, however, that the cost of transporting a ton across the ocean in an American vessel were $14.00, and that the charge was $12.00, and a subsidy was granted amounting to $5.00, so that the shipowner would get a profit of $3.00 per ton. Would such an arrangement be profitable to the United States as a nation?

The answer would depend on several things which have not been mentioned. First, let us suppose the supply of labor and capital in the United States is greater than can be profitably employed in land industries. In that case the balance sheet might be as follows:

"A"	Value of supplies and materials used for which there would be no other demand	$ 5.00
	Value of supplies, etc., obtained abroad	2.00
	Value of labor used for which there would be no other outlet	7.00
	Return to capital directly invested	.3.00

The figures used are for illustration only. The balance sheet in the case of the English vessels might be as follows:

"B"	Value of supplies, etc., purchased in the United States	$ 2.00
	Money paid out never to return	10.00

In the one case the country expends labor and material which would otherwise be unused and loses little to outside parties, the money recirculating in the country and making business brisk. In the other case the loss to the country is nearly complete, and there is no compensation, as business will feel the lack of employment of labor and non-use of the supplies which would otherwise have obtained.

Let us suppose, however, that the supply of labor can be profitably employed and that capital would have to be borrowed.

The balance sheet might be:

"C"	Value of supplies and material used for which there would be no other demand	$ 5.00
	Value of supplies, etc., obtained abroad	2.00
	Value of labor used which would be worth as much in other enterprises —net value	0.00
	Return to managers of borrowed capital	1.50
	Interest paid out of the country	1.50

A comparison of balance sheets "C" and "B" would indicate a net value to the country on account of American ownership and management of $3.00, as compared with the loss of $10.00 in case of English ownership.

The only balance sheet which could be imagined as showing no saving to the country on account of carrying its own commerce would be in case of such a dearth of labor that none could be spared from absolutely essential works in the country. Now it is very evident that such a condition does not now exist in this country, and it is equally evident that there is no likelihood of such a condition ever arising, as that is a state of affairs which occurs only in the infancy of a country, or after a national calamity.

With reference to shipbuilding as an asset, Mr. Gatewood's paper has the following:

"Shipbuilding is an adjunct of the over-seas carrying trade, just as the carrying trade is an adjunct of commerce. The commerce of the United States can be carried in foreign bottoms

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in the future just as it has been carried in the past. The loss to the country, however, is a serious one and will be felt more and more as the density of our population increases, with the consequent rivalry with the densely populated manufacturing countries of Europe. We cannot afford any longer to pay our competitors for carrying on our commerce and allow them to absorb two dollars of profit to every one dollar that we gain. Such a policy continued for a long term of years will give our competitors so great a predominance that they will finally be able to control our industries completely and leave us independent in name only. Indeed, it is probable that such control already exists to an extent which can be appreciated even now. The fact that we are a debtor nation is not due entirely to natural causes, but is due partly to the drain on our finances caused by paying other nations to do work which we should have been doing for ourselves.

Similarly we can have a merchant marine without building the vessels in the United States. But such a procedure would be subject to the same disadvantages as above mentioned, only in a less degree. These disadvantages may be summarized as follows:

(a) Reduction of output of steel mills, collieries, cordage works and the thousand and one industries which are called upon to furnish the materials and supplies used in shipbuilding and marine engine manufacture.

(b) Loss of work to the employees of the shipyards and marine engine builders.

(c) Reduction in number of plants capable of building and repairing naval vessels and their machinery.

(d) Reduction in the number of men capable of building and repairing naval vessels and their machinery.

(e) Loss of national prestige due to the effect of such a policy and the lowering of the country on the scale of progress in scientific attainments. The adaptation of general scientific knowledge to meet the needs of marine construction constitutes one of the most important branches of mental endeavor and has a reflex action on the progress and dissemination of science throughout the country. We may be a country of hayseeds, and our national wealth may lie in great measure in our farms, but we Americans are not content to take second or third place in any branch of human endeavor if first place is open to us just for the trying.

The use which England is making of her shipyards and marine engine shops today to assist her in the endeavor she is making to retain her commercial supremacy as regards Germany shows how important an adjunct shipbuilding is to her assets; mere money fails to buy what has no existence when time is lacking to build plants and to train workers essential for its production."

With regard to the government ownership or operation of steamship lines, Mr. Gatewood takes the attitude, and it is an attitude the correctness of which cannot be assailed, that government ownership of vessels is merely a form of subsidy and the most expensive form at that. He treats this phase of his subject as follows:

"This phase of the subject is one not lightly to be dismissed, as it meets all the requirements of an American Merchant Marine so far as retaining in the country the money which would be paid out to foreign carriers. Public operation is open to several serious objections, however, so soon as the character of the operations lead beyond the observance of fixed rules and requires the exercise of what is commonly known as business judgment. Inefficiency is sure to result, and the amount of subsidy paid out to cover the additional cost of transportation will be greatly increased on account of lack of efficiency in management. The five dollars previously considered will become at least ten dollars, with the consequent difficulty of distributing the advantages evenly in proportion to the burden of the increased taxation necessary to meet the larger subsidy."

Not long ago Fred A. Bishop, President of the Iron Steamship Company, went to Washington to protest against applying the full meaning of the Seamen's law to his vessels. He found that the supervising inspectors were inclined to be as lenient as possible, but nevertheless even the most liberal construction of the Act was a little too much. The Department's final attitude was conveyed in the following telegram:

"Frederick A. Bishop, Iron Steamboat Company.

"Papers in regard 'Taurus' examined. 'Taurus' is a merchant vessel of the United States carrying passengers in the coastwise trade, and as such she is subject to all the provisions of the Seamen's Act applicable to such vessels navigating ocean routes less than twenty miles offshore.

"A. L. THURMAN, Acting Secretary."

Three days later, locker holders on the steamship "Taurus" received the following notification: "'Taurus' goes out of commission for season, on account of Seamen's bill, on November 3. You are hereby notified to remove all your effects from locker on or before that date. Fred A. Bishop, President."

And there are still people who would have us believe that the Seamen's law has no effect whatsoever on coastwise shipping.

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Some Comparisons Relating to Electric Propulsion of a Battleship

By W. L. R. EMMET, ESQ., Member of Council.
American Society Naval Architects and Marine Engineers.

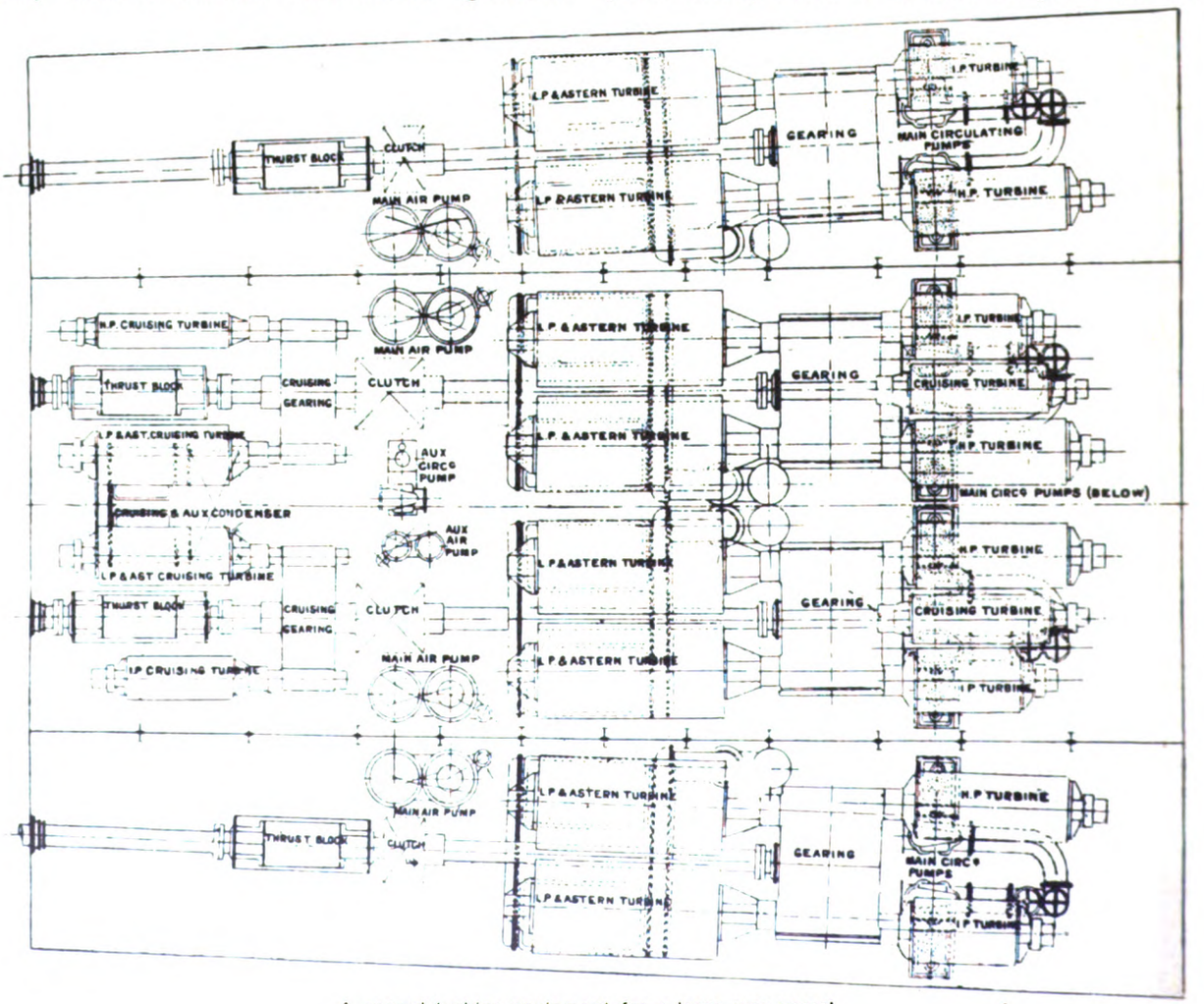
THE Navy Department of the United States has awarded to the General Electric Company of Schenectady, N. Y., a contract for electric propelling machinery for the new battleship "California," which is being built at the New York Navy Yard. This ship is of the largest and most powerful class which has been adopted by the United States. Her displacement is 32,000 tons and her maximum speed is to be about 22 knots, requiring about 37,000 shaft horse-power. The contract with the General Electric Company covers two turbine-driven generating units, four propelling motors (one for each shaft), switching apparatus, cables, instruments, etc., two turbine-driven exciting units, and a complete equipment of condensing auxiliaries and ventilating blowers, all driven by motors from the exciting units. In fact it covers practically the entire engine-room equipment except the main condensers.

Each of the auxiliary units is of 300 kilowatts capacity with a 240-volt direct-current generator geared to a high-speed, non-condensing turbine. These turbines will exhaust into the heaters, into the main turbines, or both.

The motors which drive the auxiliaries will be designed for a considerable range of speed variation so that the auxiliaries will be adaptable to economical conditions at different speeds of the ship.

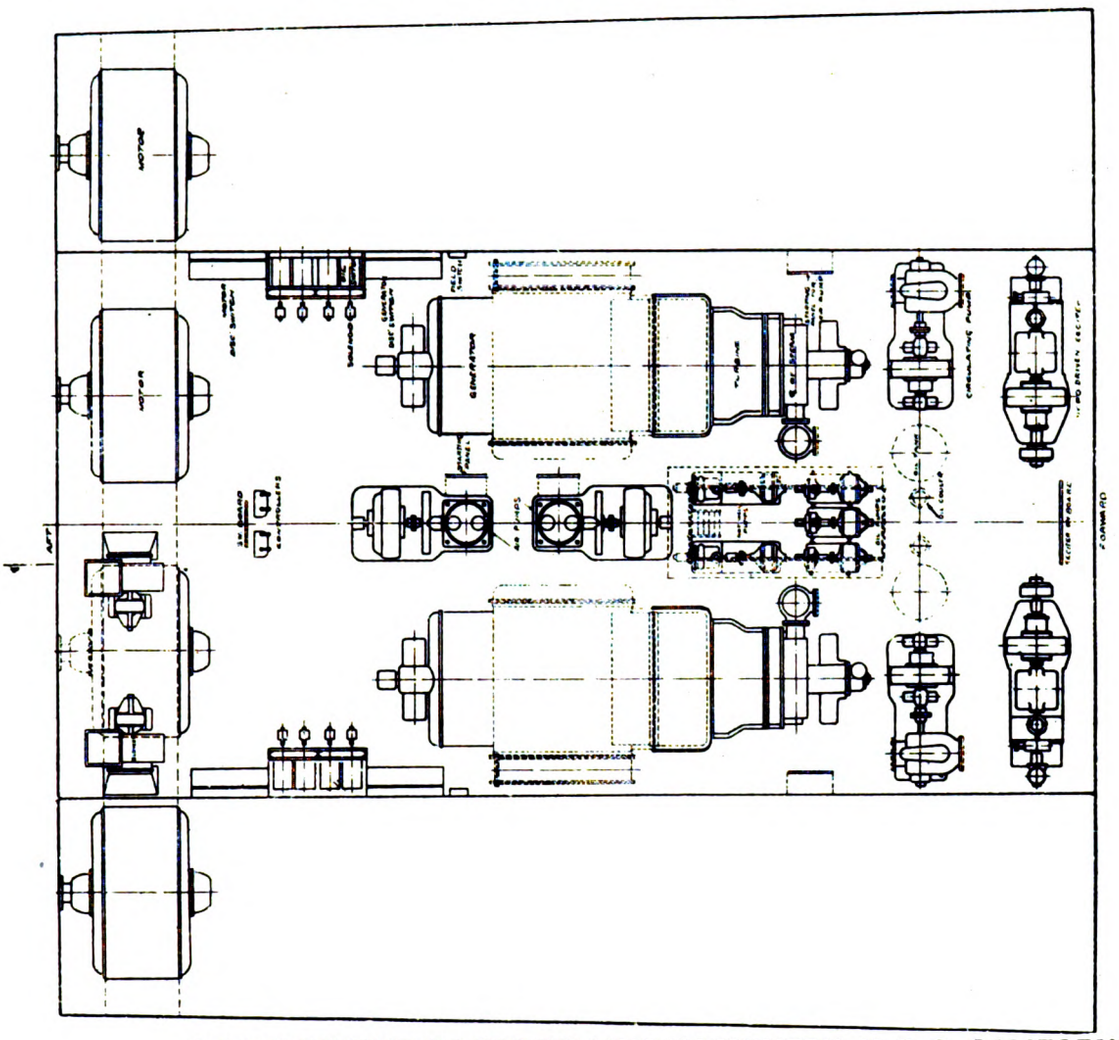
The award of this contract was the result of a very long campaign of education which has been conducted by the writer in which the equipment of the collier "Jupiter" has been an incident. The writer has from the first maintained that the proper field for electric propulsion was in ships of high power and in ships where economy at widely varying speeds was important.

The "Jupiter" has now been in commission for two years and has proved an unqualified success. The steam consumption of the main drive with 190 pounds pressure, dry steam, and 28.5 inches vacuum is 11 pounds per horse-power hour delivered to the propeller shafts, which is at least 30 per cent. better



A geared turbine equipment for a large war vessel.

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ARRANGEMENT OF PROPELLING MACHINERY, U. S. S. CALIFORNIA.

than is done by reciprocating engines in ships of the class. There is also evidence of further saving in the "Jupiter," incident to the fact that her large low-speed propellers are turned with a perfectly uniform angular motion and with entire freedom from racing, conditions heretofore unknown with such propellers.

The details of the "Jupiter's" installation have been described in previous papers presented to this Society. All predictions made by the writer in connection with the "Jupiter" have been exactly fulfilled. The following quotation from a paper by Lieut. S. M. Robinson, Chief Engineer of the "Jupiter," shows the opinions of the men who have had experience with this equipment:

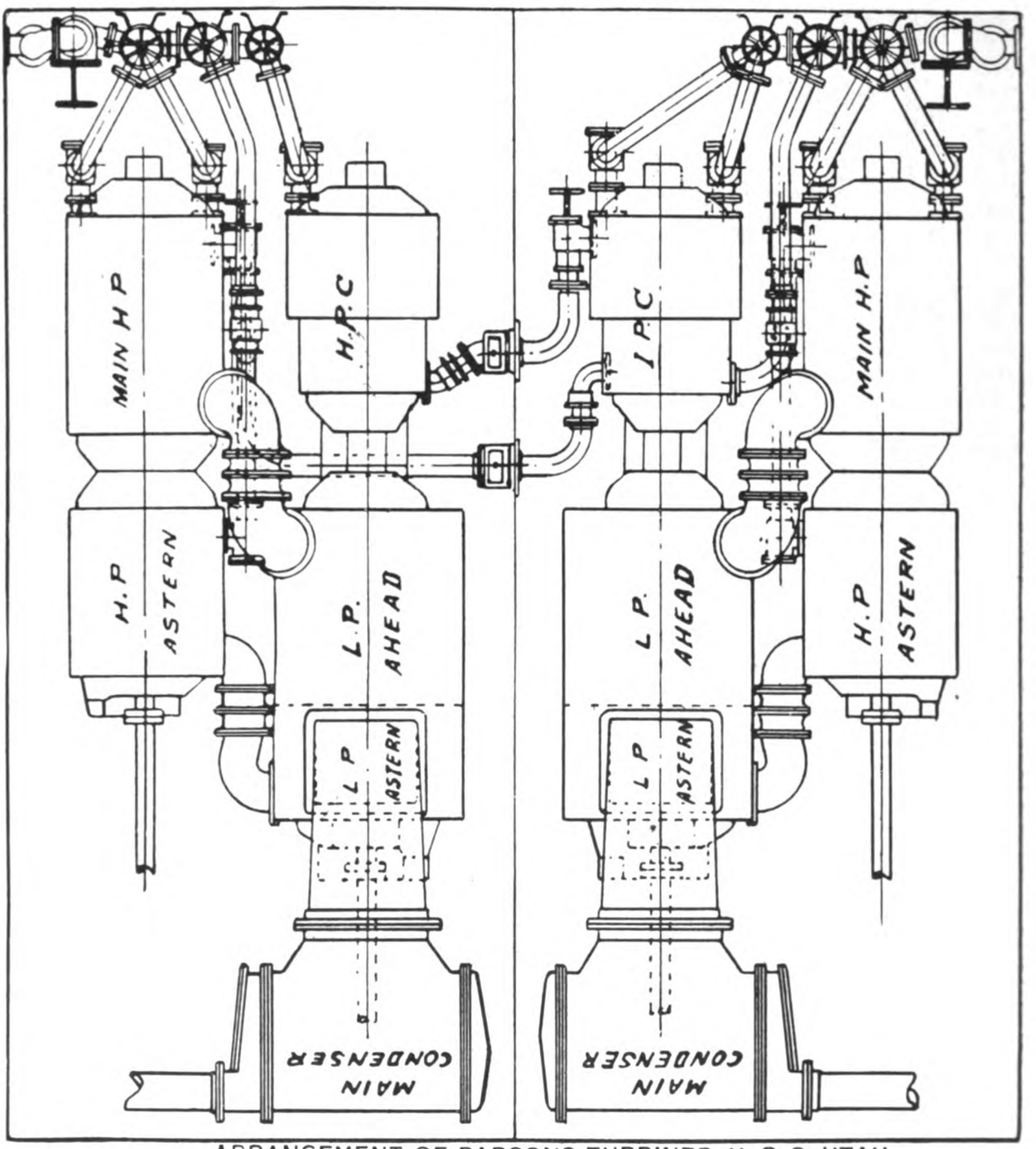
"After all, the greatest test of the satisfactory working of any machinery is whether or not the men who are actually handling it and caring for it are pleased with it. If this test applies to the 'Jupiter's' machinery, it certainly is an unqualified success. In particular is this true if the matter is referred to the coal passers in the fire-room who have to handle much less coal than do the men on sister ships. The ship can make her contract speed of 14 knots without using forced draft at all."

The generators for the "California" are bipolar alternators, and the motors are arranged to be connected either for 24 poles or 36 poles. For economic cruising at 15 knots or less, one generator will be used with motors on 36-pole connection. For higher speeds the 24-pole connection will be used. The ship will be capable of operating at a speed of about 18.5 knots with one generator.

Speed variation with either motor connection will be effected by change of turbine speeds through the agency of variable speed governors designed to hold automatically any desired speed within usual ranges. This arrangement, which is also used in the "Jupiter," entirely prevents racing and makes it convenient to hold a fixed speed irrespective of variations in sea, weather or steam conditions. It is thought that this feature will be valuable in fleet formations.

The steam consumption guaranteed on the "California" covers the total steam required for the main turbines and engine-room auxiliaries as described above. The conditions are 250 pounds gage pressure, dry steam, with such vacuum as can be produced under trial conditions. The guaranteed water rates per horse-power delivered to the propeller shafts are as follows:

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ARRANGEMENT OF PARSONS TURBINES, U. S. S. UTAH

	Lbs.
At 10 knots	14.6
At 15 knots	11.4
At 19 knots	11.1
Maximum speed	11.9

Very heavy penalties are imposed in case these guaranteed consumptions are exceeded in trials, $25,000 per pound for the two lower speeds and $20,000 per pound for the two upper speeds.

At full speed the "California" propellers will make 175 revolutions per minute, this being about the lowest speed of propellers which is practicable within the space. The propeller speeds proposed for the sister ships with Parsons turbine drive is 240 revolutions per minute, and comparisons by Dyson's method indicate that this speed difference will give the "California" an advantage of about 9 per cent. in propeller efficiency.

The following table gives a comparison of steam consumption per effective horse-power between the "California" as guaranteed, the "Florida" and "Utah" which are driven by Parsons turbines, and the "Delaware" which is driven by reciprocating engines. These figures are taken from the published records of trials.

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Pounds of Steam to Main Engines Per Hour Per E. H. P.

	12 knots	15 knots	19 knots	21 knots	Prop. speed 21 knots
"Florida"	31.8	....	24.0	23.0	328
"Utah"	28.7	....	20.3	21.0	323
"Delaware"	22.0	....	18.7	21.0	122
"California"	17.3	15.2	15.0	16.4	175

Such a table as this affords the truest basis of comparison of prime movers in ships.

The estimated weight of the propelling machinery without condensing auxiliaries is 530 tons, and that of the turbines originally proposed was 653 tons.

The contract price for the "California" propelling machinery with auxiliaries given above is $431,000. The estimates made at the New York Navy Yard indicate that this equipment will cost $200,000 less than the Parsons turbine equipment previously considered.

The accompanying cuts show engine-room arrangements with three types of machinery. Figure 1 is the California. This is the arrangement suggested by the General Electric Company's proposal, but a somewhat different arrangement will actually be used. Figure 2 is the "Utah," and Fig. 3 a geared turbine equipment for a large warship shown in a paper by Sir Charles Parsons. Attention is called to the simplicity of piping, steam and vacuum connections with the electric drive as compared with the other methods. The "California" has two turbines, the "Utah" has ten, and the proposed Parsons geared equipment has thirty-two.

All of the steam passages between turbines in these arrangements involve loss of useful pressure, and many of them involve risk of vacuum loss through air leakage, for it must be remembered that ships are often subject to vibration and that there may be appreciable relative motion of these different parts through expansion strains or working of the ship, or through their own inertia when the ship is vibrating or laboring in a seaway.

The advantages and simplifications incident to electric drive are greatest in such large warships as are here shown, but they apply in only slightly lesser degrees to all large high-power vessels.

The Coast Guard and Fisheries

By E. LESTER JONES.

When I made my trip of investigation to Alaska last year, I did so as United States Deputy Commissioner of Fisheries, and naturally my efforts were directed largely along the lines connected with the functions of my office. But before I had fairly started on my trip there was a serious question—yes, an **obligation** of the Federal Government—which loomed up to me as a most important factor in the future development of Alaska's great industry, namely, its unsafe and unprotected waters, and the very little work which was being done to remedy this discrepancy in the territory's present condition and development; also the fact that so many had failed to recognize its significance, and that on the whole little preparation was being made to correct this evil by the provision of proper funds for safe vessels in which to conduct the surveys of waters, and with the vessels more men to carry on the work whenever it is possible to do so.

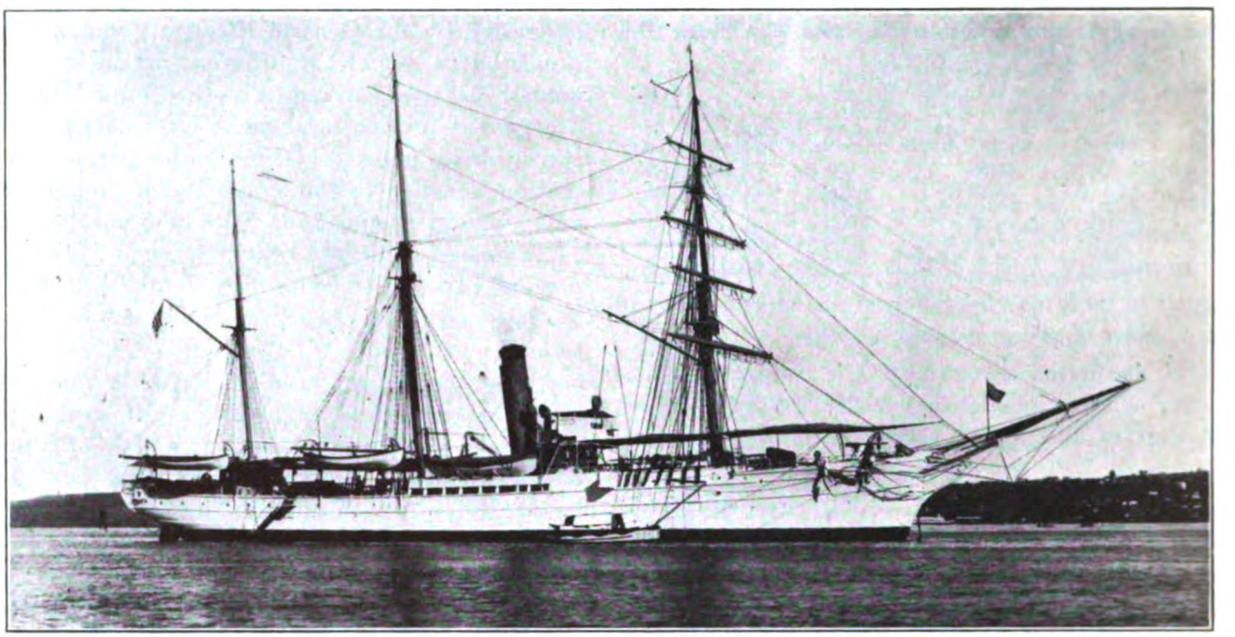
In 1914 the various fishing fleets operating in Alaska waters approximated 2300 vessels, with a total net tonnage of almost 147 thousand; and valued at nearly 8¼ millions of dollars. The home ports of these vessels are in Alaska, or the seaports of Washington, Oregon and California.

Alaska has been owned by this country for 48 years, and to-day all vessels, both fishing and commercial (as well as government vessels), still ply through largely unprotected waters, endangering both life and property. It is interesting to note that the failure to safeguard the seas, the bays, etc., has exacted a heavy toll from the fishing interests of the Pacific Coast and Alaska. During the last 15 years there have been over 70 sizable vessels, valued at over 2½ millions of dollars, lost in the waters of Alaska. In addition to this, and of more serious importance by far, has been the loss of life. It is no wonder that the people who have invested their money in vessels to carry on a large and legitimate business should hesitate to enter the waters of Alaska, of which there are not only no correct surveys, or no surveys at all, but which are generally without light houses, buoys and other aids to navigation.

I am fully aware that in many instances these fishing companies have found it necessary to make their own surveys of the channels, which has been done at considerable expense and loss of valuable time.

This may seem to reflect on the U. S. Coast and Geodetic Survey. But the blame does not lie there. The survey *is* doing and *has* been doing everything possible with the means at hand—indeed it has almost accomplished *more* than possible for it goes without saying that boats like the "Gedney" and "McArthur," 41 and 40 years old respectively (ready to sink at almost any time), are not only *unfit to accomplish efficient work for a Government like ours, but endanger the lives of the men in our service.* In addition to these vessels, the steamship "Patterson," used

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The Coast Guard Cutter "Bear." The type of vessel that is performing a service that benefits the entire world.

in more unprotected places, and the "Taku," used in carrying on inshore soundings, are not the kind of vessels which should now be used or be kept in commission for doing the most efficient work of this sort. I am glad to say that Congress last year appropriated money, a part of which was for a new vessel to be known as the "Surveyor," which will be used exclusively in carrying on surveys in Alaskan waters.

This, I hope, marks a new era, not only in furnishing a high type of vessel, peculiarly and properly adapted for this work, but which will mean the beginning of an expansion whereby we will have given us regularly, the urgent needs for carrying on the work.

It is beyond my comprehension that a Federal Government which has laws that make it a criminal offense to provide unsafe and improperly equipped *privately* owned vessels, would permit Federal officials to man and operate these unsafe and otherwise inefficient crafts that should be, in some instances, consigned to the scrap heap. It is asking too much of our officers and men, who have already established a high standard of loyalty and efficiency, to jeopardize their lives on these vessels. They are a brave set of men and have no superiors in the world. They act as navigators, engineers, paymasters and surveyors, and I protest against the injustice of asking these men, who are themselves looking for dangers with the idea of protecting the lives of thousands of people, besides millions of dollars in property, to live on vessels that are unfit for any service, and which endanger their own lives.

I can assure you that one of my biggest efforts will be not only the literal carrying out, as far as our own vessels are concerned, of all the provisions of the Federal laws; but I want the standard so high that we are fully complying with all the provisions of the Steamboat Inspection regulations so that our boats are a little safer and more efficient than those belonging to the merchant marine.

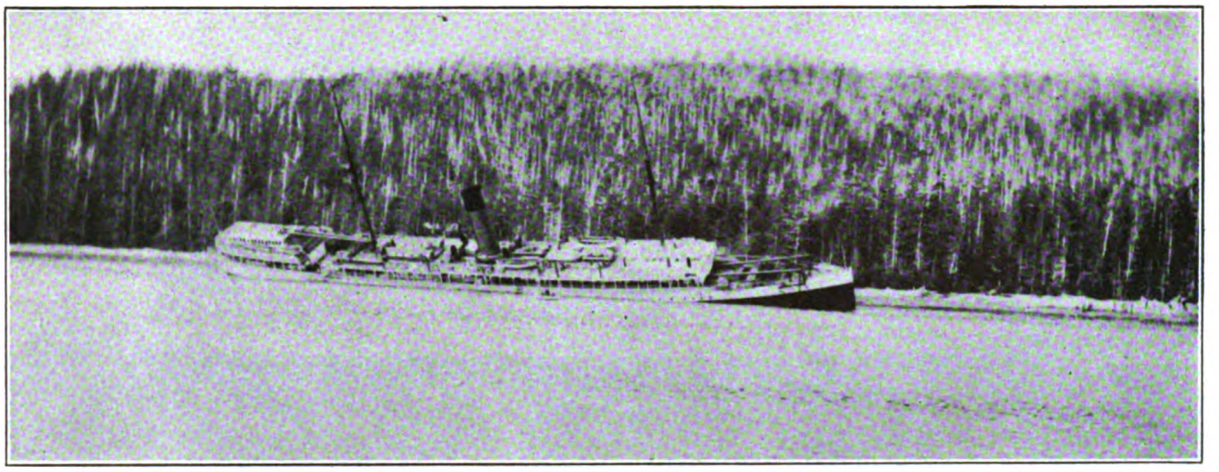
When I was in Alaska in 1914, and noted the excitement in reference to the plans for the new Federal railroad for which Congress appropriated $35,000,000 (and which no doubt is a great step toward bringing stability and permanency of commerce, and a class of people that are desirable as citizens of that great territory), I could not help seeing equally, if not with greater force, that the real success of the territory was dependent upon the safety of her waters. Alaska can never fully develop until her waterways, which are her real gateways to commerce, are safe to human life and property.

I hope that a large majority are awakening to this fact and I am constrained to believe that Congress, with the facts more clearly placed before it, is going to provide a sufficient sum to give the Coast and Geodetic Survey the necessary funds to put this work on the broad basis it deserves.

So much importance did the President attach to this question, and to the past neglect of such an important obligation of the government, that he referred to it in no uncertain terms in his annual message at the last session of Congress. The Secretary of Commerce has fought for more than two years to have a proper recognition given this need of his department, and I am glad to say that his untiring efforts are beginning to bear fruit.

I know from experience that your Senators and Congressmen on the Pacific Coast are with you heart and soul in furthering this great work for Alaska; and I feel it incumbent upon me to use my every effort toward furnishing not only these members of Congress, who are so naturally and vitally interested in helping to solve this problem, with all necessary information; but I hope that a

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The Steamship "Mariposa," wrecked in the Lama Passage. The "Mariposa" was successfully salved and brought to Seattle.

proper, quiet, thoughtful, and sane appeal to other members of Congress will make them ready and willing to lend their support.

It is pertinently asked what our needs for carrying on the work are. This is easily answered. First, *more vessels specially constructed for the work; and more men,* not only to man the new vessels, but enough of them to carry on the work every day of the year, weather permitting. In addition to this, to insure absolute thoroughness and safety in the waters of Alaska, and in the harbors and bays of the Pacific Coast, the wire drag is the only adequate method to employ. This requires many men and small boats of the type necessary to make the carrying on of the work feasible and practicable. This is not a cheap method of getting exact results; but may I ask, isn't it necessary both from the human as well as the commercial standpoint? And is it economy for the Government to save a small first cost and in a few years to lose nearly a million dollars in vessels, thereby, not to mention a much greater amount lost to the fishing interests?

I hope the day is at hand when we can see these things in a broader light, and in no light of false economy.

Motor Ships Constructed During the War

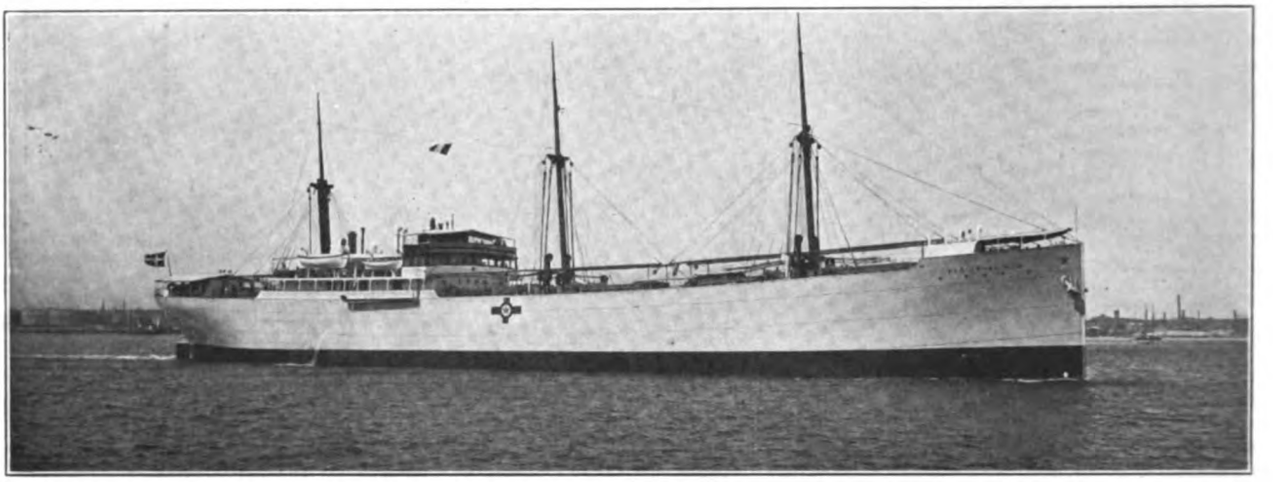
THE accompanying table gives the details of all the large motor ships constructed in Great Britain and Europe during the first year of the war. For this highly interesting résumé of motor ship conditions we are indebted to the Motor Ship and Motor Boat, the leading British journal dealing with internal combustion engines. It appears that no motor ship was constructed in Germany during the year. The "W. A. Ridermann" was due for completion late in 1914, but, as she was being built and engined by Krupp's at Kiel, where every energy has been bent on naval and munition work, it is highly improbable that the vessel has been completed. It is known that just before the outbreak of war the two engines had been finished, but it had been intended to give them prolonged trials, in order to arrive at the best design for cylinder covers. Messrs. Burmeister and Wain show up very well in comparison, while the Werkspoor, also, has done fairly well.

The British vessels were interesting in that they represented three different types of motors, two of them two-cycle. Had it not been for the war it is probable that another half dozen motor ships would have been completed in England, but their construction is now held up more or less indefinitely.

New orders placed during the year were nearly all with continental builders, somewhere between 20 and 30 new ships being contracted for. The four-cycle engine has been nearly predominant for the past 12 months and since practically all the development work on the two-stroke motor has been carried out in England and Germany, it is improbable that any great progress will be made until after the war, so that the hold which the four-cycle motor has gained on the ship-owner will be largely augmented, and the difficulty of developing the two-cycle set will have been increased. As, however, three of the leading British shipbuilding and engineering firms have staked their fate on the two-cycle machine, it is hardly likely to be passed over in favor of the four-cycle motor without a considerable struggle.

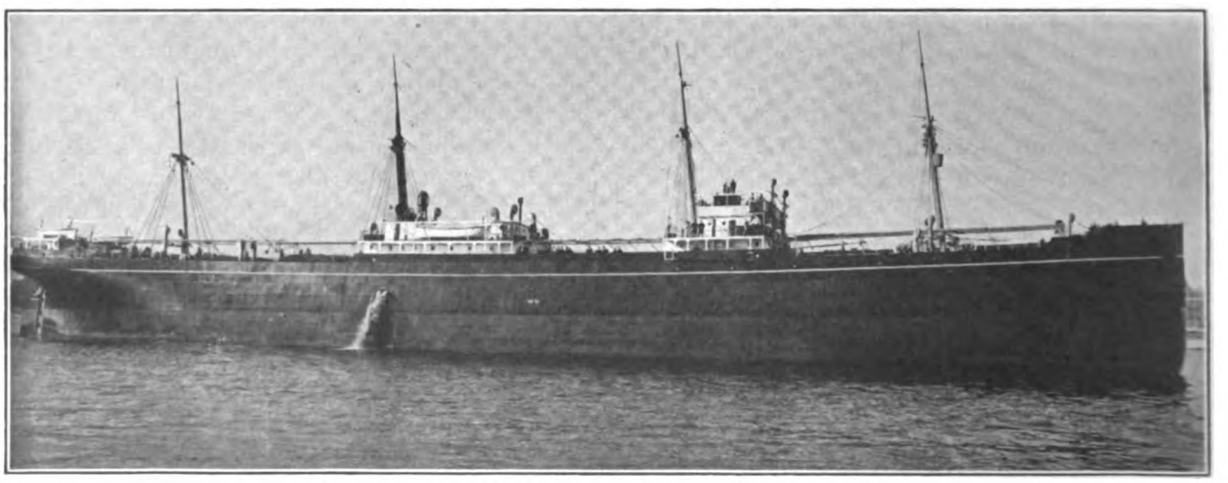
The motor ships now in hand aggregate 45, the majority of which are due to go into commission during the present year or early in 1916.

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The motor ship "San Francisco," a Burmeister & Wain output.

Name of Vessel.	Owners.	Builders of Hull.	Length	Beam	Depth	Draught	D—Displacement C—D.W. Capacity G—Gross Register R—Net Register	Builders of Engines.	Number of Engines	Total B.H.P. (*Indicates I.H.P.)	No. of Cylinders per Engine	Bore mm.	Stroke mm.	Revolutions per minute	Four or two Stroke	Speed of vessel in knots
			ft. in.	ft. in.	ft. in.	ft. in.										
Chumpon ..	East Asiatic Co	Existing	330 0	47 3	—	—	G3487	Burmeister & Wain Glasgow	1	1600	6	690	1030	15	4	—
Falstria	"	Harland & Wolff	381 0	50 0	29 0	—	G4500	"	2	*2250	6	560	730	140	4	—
Arabis	Flower Motor Ship Co.	Swan, Hunter and W. Richardson	360 0	47 0	27 0	21 6	D5600	Swan, Hunter and W. Richardson	2	1200	4	410	860	135	2	9½
Motricine ..	Soc. Napthes Transports	Chantiers de St. Nazaire	350 0	46 0	27 0	21 0	G5200	Chantiers de St. Nazaire	2	1700	6	520	900	135	4	—
Poseidon ..	Anglo Saxon Petroleum Co.	Smith's Dock Co.	185 0	30 6	13 3	11 9	C335	Werkspoor	1	*450	4	400	760	175	4	—
Bandon ...	East Asiatic Co	Existing ship	330 0	47 3	—	—	R3487	Burmeister & Wain Oil Engine Co., Glasgow	1	*1800	6	670	1000	115	4	—
Mississippi	Atl. Tr'sport Co.	Harland & Wolff	383 0	50 4	—	—	C6500		2	*3600	6	690	1030	115	4	—
Hermes	Anglo Saxon Petroleum Co.	Palmer's Shipbuilding Co.	347 0	46 0	27 6	22 0	C5050	Werkspoor	2	*2250	6	520	900	135	4	10½
Selene	"	Caledon Co.	347 0	46 0	27 6	22 0	C5050	"	2	*2250	6	520	900	135	4	10½
Elbruz	Société d'Armament d'Anvers	Tyne Iron and Shipb'l'dg Co.	390 6	51 0	29 0	23 0	C6230	"	2	*3000	6	560	1000	125	4	11
Pioneer	Mr. P. E. Singer	Camper & Nicholsons	168 0	34 6	—	9 6	D400	A. B. Diesels Motorer	2	550	4	320	470	200	2	13½
Malakka ...	East Asiatic Co	Burmeister & Wain (Copenhagen)	410 0	55 0	30 6	26 6	C9200	Burmeister & Wain (Copenhagen)	2	*3100	6	630	960	115	4	12¾
Tongking ..	"	"	410 0	55 0	30 6	26 6	C9200	"	2	*3100	6	630	960	115	4	12¾
Pacific	"	"	362 0	51 3	25 6	23 1	C6550	"	2	*2000	6	540	730	140	4	10¾
Australien .	"	"	410 0	55 0	30 6	26 5	C9200	"	2	*3100	6	620	960	115	4	12¾
Mijer	Royal Packet Co.	Rijkee, Rotterdam	278 0	41 0	19 0	15 0	C1750	Werkspoor	1	1150	6	560	1000	125	4	—
Siberg	"	"	278 0	41 0	19 0	15 0	C1750	"	1	1150	6	560	1000	125	4	—
Utrecht	Anglo Saxon Co.	Existing ship	217 0	40 0	14 2	12 0	C1500	"	2	*800	4	400	700	150	4	—
Lara	"	Pots Bros.	190 0	32 6	14 0	11 9	C875	"	1	*600	6	400	700	160	4	—
S. Francisco	Nordstjernan (Stockholm)	Burmeister & Wain (Copenhagen)	362 0	57 3	25 6	23 1	C6550	Burmeister & Wain (Copenhagen)	2	*2000	6	540	730	140	4	10¾
Panama ...	East Asiatic Co	"	410 0	55 0	30 6	26 5	C9200	"	2	*3100	6	630	960	115	4	12¾
Abelia	Flower Motor Ship Co.	Armstrong, Whitworth & Co.	360 0	47 6	27 0	21 6	D5600	Armstrong, Whitworth & Co.	2	1200	4	17¼	33	120	2	9½
Brazil	Fred Olsen	Akers Verksted	323 0	45 0	28 6	—	C4800	Akers Verksted	2	*1500	6	500	660	140	4	10



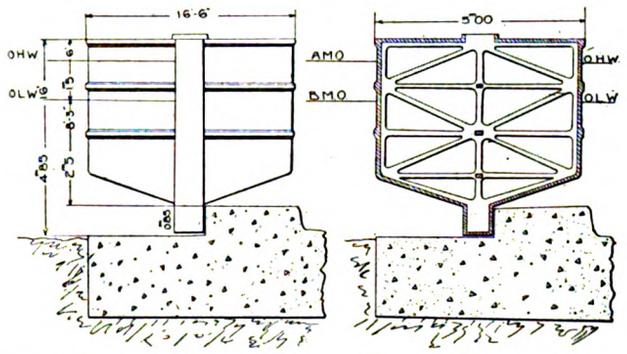
The motor ship "Tongking," built by Burmeister & Wain.

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Dry Docks Recently Built in Italy

By PROFESSOR LUIGI LUIGGI, Dr. Sc., M. Am. Soc. C. E., M. Int. C. E., President Italian Society Civil Engineers, Rome, Italy.

THE principal Italian ports are provided with dry docks sufficient for the needs of naval and merchant shipping and among the largest may be mentioned the navy yard docks of Spezia and the commercial docks of Genoa, built in 1892 by the author, and the more recent ones of Naples and Palermo; varying in length from 600 to 720 feet and admitting the largest ships that navigate



Ferro-concrete caissons are popular in Italy for small and medium-sized docks.

the Mediterranean. The same could not, until recently, be said of the navy yards of Venice and Taranto, so in 1911 it was decided to construct in these ports docks of the following dimensions:

	Taranto. ft.	Venice. ft.
Present length at coping	820	820
Docks may be lengthened to	920	986
Width of entrance at coping	134	120
At mean water level, width	133	119
Depth of sill below mean water level	39.4	36.2
Range of tide	1	2
Time for pumping the docks	3½ hours	4 hours

The great width was adopted in order to allow the docking of ships in such a damaged condition that they needed the help of lateral caissons. The advisability of this was demonstrated during the salvage operations of the battle cruiser "San Giorgio." Another important feature is the great depth of the sill, some 8 to 10 feet more than usual, in order to admit ships even in an almost sinking condition.

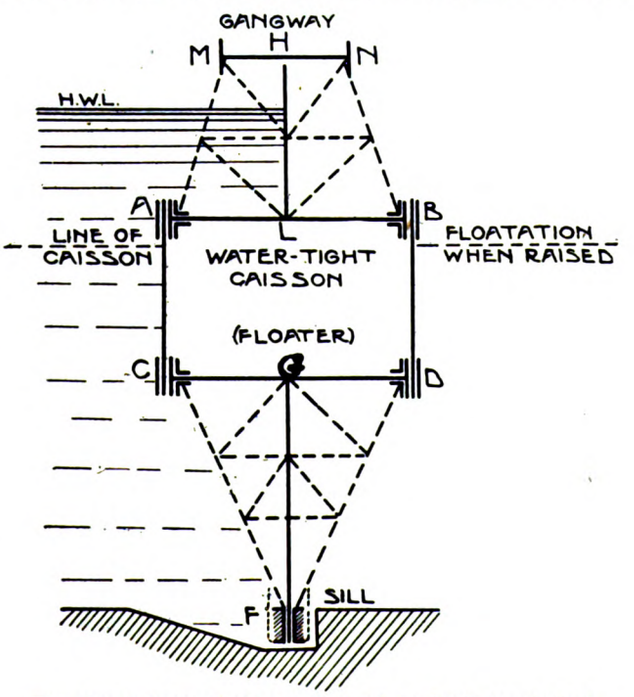
The Taranto dock, now nearly completed, was constructed inland by ordinary methods. It rests on a deep layer of compact clay. The two side walls were built first, between sheet piling, leaving a central core, which was dug out afterwards in small sections, so that the floor—made entirely of lime and pozzolana concrete—could be put in as fast as the excavation advanced.

The concrete was made of lime, pozzolana and gravel, in the proportions of one part in volume of ordinary slaked lime, two parts of pozzolana containing about 60 per cent. of silica, and four parts of stone broken to 2" gauge. As this concrete takes about two weeks to harden sufficiently to allow of another layer being deposited, its setting was hastened by adding 180 pounds of Portland cement to each cubic metre which increased the resistance to compression from 95 to 160 pounds per square inch.

At Venice the dry dock had to be built in the sea, on a foundation of sand mixed with clay, sufficiently compact but very permeable. The work was carried out under water by means of compressed air caissons suspended from pontoons, which could be raised as soon as a layer of concrete was deposited—about 10 cubic metres of concrete could be laid per hour. In order to prevent the danger of decomposition of the cement concrete, caused by the slow percolation of sea water when the dock is dry, the Portland cement was mixed with some pozzolana. This, being rich in silica, neutralizes any free lime present in the cement and forms a compound which will resist decomposition for centuries. The proportions adopted were:

	Outer revetment.	Inner core
Portland cement	850 pounds	550 pounds
Pozzolana	0.10 cubic metres	0.07 cu. m.
Sand	0.45 cubic metres	0.44 cu. m.
Broken stone	1.00 cubic metres	1.00 cu. m.

The concrete for the outer revetment was made richer in cement and pozzolana in order to be more



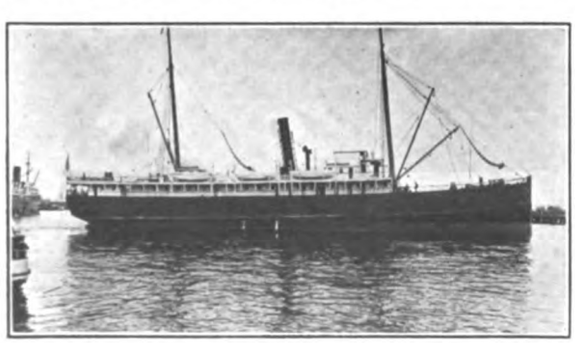
The simple form of caisson evolved by Professor Luiggi.

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impermeable. Under 30-foot head it does not show any sign of leakage after 3 days. Its resistance to crushing at 7 and 28 days is 1690 and 2180 pounds per square inch. The dock is faced with ashlar masonry and the hollow quoins for the caisson are of granite.

The caissons are of a special type, applied for the first time in 1892 by the author at Genoa, and afterwards used for all similar docks in Italy. This type is the most simple to construct, can be easily removed and kept in repair at the least expenditure. They are accessible in every part, including the inner tanks. They are formed by two strong beams AB and CD, united by the plates AC and BD, forming a hollow beam, which acts as a floating caisson for raising or lowering the structure. This beam supports a series of brackets CDF, resting in F against the sill and affording the necessary rigid support to the iron plates FG. Above the hollow beam are other brackets AMLH and HLMB which support another iron plate HL and the beam MN which acts as a gangway across the dock entrance. The caisson, being symmetrical, can be turned so that the face exposed to the sea can be turned towards the dock for cleaning and painting. The hollow beam is from 8 to 9 feet high and can be easily inspected and kept in good condition. The raising and lowering is done by opening or shutting some valves below or above the floating line. Thus without the assistance of any special pump or artificial addition of water, the maneuver can be performed by a single operator. The only mechanical appliance is a hand bilge pump used to draw off any slight leakage. The cost of this type of caisson is about 70% of that of the usual caisson with curved sides and, owing to its simplicity, calculations for pressure against the sill grooves can be made with great accuracy.

An interesting, if smaller, dock for harbor craft has just been completed at Venice. The dimensions of this dock are 480 feet length on blocks, 66 feet width at entrance and 12 feet depth on sill. The caisson for this dock is made entirely of ferro concrete with the exception of wooden fenders. The advantages of these structures are that they last for many years even in sea water, need very few repairs and no painting, and, if damaged, can be easily patched with cement; and they cost only half as much as steel caissons. Barges of this construction have been in use in Italy for nearly 10 years and are still in good working condition. They are adapted specially for tropical countries, where iron oxidizes very quickly.



The steam schooner "Santa Clara," one of the marine losses of the month.

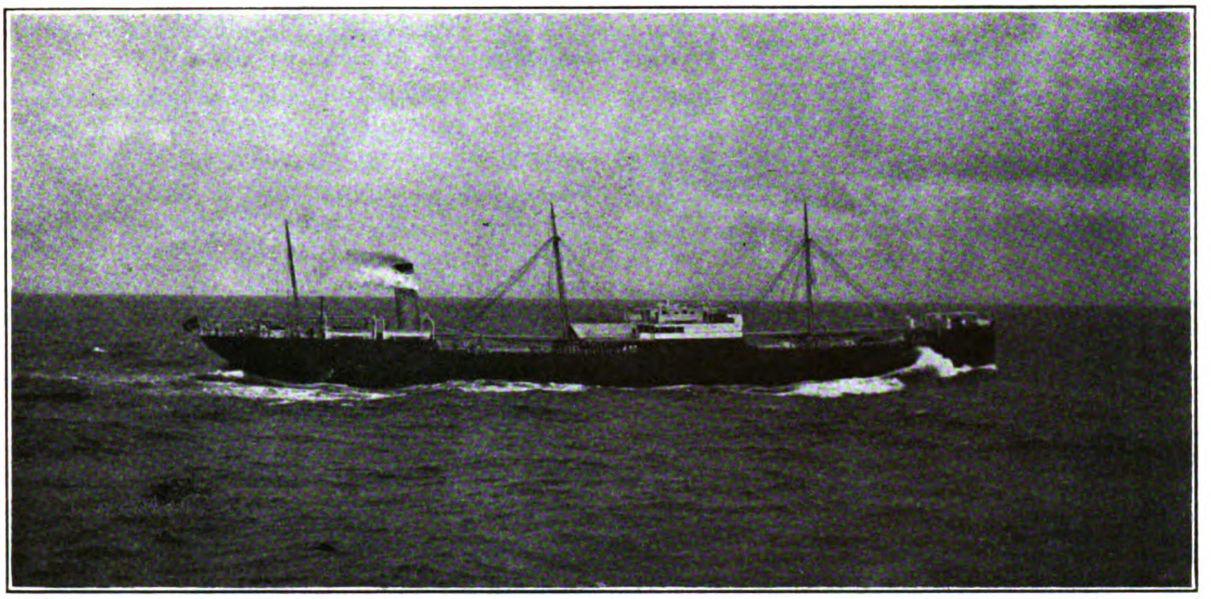
THE MATSON LINE.

As early as 1854 an attempt was made to establish a steam line between Honolulu and San Francisco. At that time the British steamer "Polynesian" arrived at the Islands seeking business, and nothing else offering, the steamer accepted a proposition to inaugurate a regular service to San Francisco. One trip was sufficient. Other attempts were made in the early sixties, but it was not until 1868 that anything like a regular steamer connection was established. In 1870 the "Idaho," "Ajax" and "Moses Taylor" (the old "Rolling Moses"), together with the "Costa Rica," gave the Islands a fairly regular service up to 1874. In 1878 the Pacific Mail again took up the service with chartered steamers, while in 1882 the Oceanic Steamship Company took up the service, putting on the fine new steamers "Alameda" and "Mariposa." Prior to 1870 there was a very large fleet of sailers engaged in the Hawaiian Islands trade, but these were gradually dispensed with as steamers grew more numerous and larger.

It will be seen from the above that while in the early days connections with the Islands were somewhat intermittent, that there was a steady improvement going on. Of late years the passenger and freight business between San Francisco and the Islands has enjoyed the services of the splendid fleet built up by the Matson Navigation Company, a fleet which is hardly equaled on any similar route in the world.

The growth of the Matson Navigation Company is best evidenced by its steamers. Its first three steamers—the "Enterprise," "Hilonian" and Hyades" —were vessels of 2675, 2921 and 3753 gross tons respectively, but in 1908 the Matson people began to build boats specially designed to meet the requirements of their trade. Thus in 1908 they brought out the "Lurline," 412′ 8″ by 53′ 1″ by 29′ 2″ in general dimensions and of 5928 gross tons, and this vessel was followed by a still larger one in 1909, the "Wilhelmina," 426′ 1″ by 54′ 1″ by 33′ 5″ and of 6975 tons. Each of these boats was an advancement on its predecessors in other ways beside size and evidenced a determination to give the Island service continually more and better ships. Towards the end of 1913 the present flagship of the fleet, the "Matsonia," was brought out. This was a vessel 500′ by 58′ by 44′ 9″ in general dimensions. Aside from the cargo facilities of this new vessel, decided advances were made in the way of passenger accommodations, many rooms being fitted with private baths and the public rooms being especially handsome in finish and furnishings. The "Matsonia" was followed in a few months by the "Manoa," a

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The "Wilhelmina," of the Matson Navigation Company's fleet.

steamer 446′ by 54′ by 33′ 6″ in general dimensions. While smaller than her immediate predecessor, this big craft is a fine cargo boat and the comfort and roominess of her cabins have made her a favorite with the traveling public. The latest announcement of the Matson Navigation Company is of the building of a fine new steamer at the Union Iron Works. Full particulars of this vessel will be published at an early date.

This is a record of new construction which marks an endeavor to keep the Matson Navigation Company to the forefront of progress in shipping construction and which has resulted in the company's securing and holding the good will and well wishes of both the Hawaiian business world and the ocean traveler.

"Any employee of this company who is now, or may become, a member of the New Jersey National Guard will be allowed vacation with full pay during such working days as he may be called upon for parade, encampment, or other military duty of such organization." This notice pasted on the walls of the shops of the George Stratford Oakum Company shows a spirit which, were it universal throughout the country, would simplify greatly the problem of "preparedness."

The Blue Funnel line steamer "Calchas," which sustained heavy damages in grounding on the Point Wilson shore in October, is again in service. Her repairs cost in the neighborhood of $60,000 and were completed in eighteen days.



The "Kroonland" leaving San Francisco for Europe. Note the name and the American flags painted on her side.

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ADMINISTRATION MISINFORMATION.

Among the choice bits of misinformation in Secretary McAdoo's speeches, as quoted generally throughout the country, is the following:

"While the value of our exports in dollars has increased because of higher prices for them, our actual tonnage probably shows a decrease."

The word "probably" perhaps saves the statement from severe censure, but at the same time it admits ignorance on a matter of which the secretary can easily obtain the highest information. For a high government official "to think" a thing in reference to an important public matter is hardly permissible—he should "know." The total exports measured by quantities for the first nine months of the past three years were as follows:

Measurement medium.	1913.	1914.	1915.
Barrels .	8,910,156	8,204,434	11,580,259
Bushels.	143,658,030	143,832,426	308,818,290
Pounds .	1,114,952,928	905,177,795	1,850,933,100
Gallons .	1,504,868,564	1,695,583,269	1,733,628,143
Bales ...	1,187,480	176,988	663,640
Catttle...	5,549	6,983	14,752
Hogs ...	11,175	10,771	4,648
Sheep...	72,995	72,642	24,185

Now when we add the well-known increases in automobiles and war material to the great increases in staple commodities indicated by the above table, where does Mr. McAdoo's statement "while actual tonnage probably shows a decrease" come in? If the rest of Mr. McAdoo's arguments are as shaky as this one, surely he has not made out much of a case for the administration shipping scheme.

Now, how about the ship shortage and the great quantities of American products that are patiently waiting transportation? The net tonnage of vessels cleared in foreign trade of the United States for nine months ending September, 1915, was 4,698,994. Last year for the same time the total was 4,151,028 tons. Despite war, mines and torpedoes, and despite the heavy toll on the merchant fleets of the world for government transport services, the clearances from American ports of vessels in the foreign trade have actually increased. Is the government not a little behind time with its wail about shortage and is not Secretary McAdoo's statement anent the decrease of our actual tonnage rather an argument of expediency than a fact?

A NOVEL SUBSIDY PLAN.

A few weeks ago Senor Don Pedro Mihanovich, manager of steamship lines well known to traders in South America, presented a novel proposal to the Argentine Congress for building up an Argentine merchant marine. It is that Argentina shall make a 20-year contract with him for a steamship line between Argentine and English ports. The equipment is specifically described as to be of the best in South American service. The company shall carry any Government freight at a reduction of 10 per cent. from ruling rates, carry free the mails and any specie the Government desires transported, also parcels-post packages going to England up to a certain weight. The Government is also to be given the right to commandeer vessels in time of war.

Now the interesting feature: In lieu of a Government subsidy in ordinary form, the operation of the line is to be helped by the Government's supplying all the officers and seamen aboard the ships (except the pursers), the officers from the Argentine navy, the engineers likewise, and the seamen as a training force of conscripts for the national navy. Loading and unloading of vessels is to be done by company employes. This plan, Senor Mihanovich urges, would offer the necessary subsidy to make the shipping pay and at the same time substitute practical navigation and seamanship for the academic training of the naval forces.

Genoa now possesses a set of malefactors who make even the stealers of red-hot stoves look sick with envy. The British steamer "Tasso," upon attempting to leave that harbor some time ago, had her engines started, but made no headway; in fact, the engines raced most unmercifully. Examination uncovered the fact that her bronze propellers had been stolen.

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Secretary Redfield Answered

In reply to an open letter from Secretary of Commerce William C. Redfield, questioning the fact that the Pacific Mail Steamship Company was driven out of its trans-Pacific business by the operation of the Seaman's Act, Julius Kruttschnitt, chairman of the Executive Committee of the company, has written the following, in which he reiterates that after a careful review of the subject when the bill was passed, the company was unable to find any way to overcome the difficulties with which it was confronted, and consequently, with the approval of the shareholders, withdrew from the business and sold the ships:

"I have read your letter to me of November 5. The reasons why the Pacific Mail could not continue to operate its trans-Pacific ships, if the Seaman's bill became a law, have been given to committees of Congress in detail, with supporting figures, which have never been answered. In a letter to President Wilson, July 6, 1914, I summarized the objections to the proposed legislation and gave notice that it would result in the withdrawal of the trans-Pacific ships. The language clause, while one of the most objectionable features of the bill, was only one of several unreasonable and onerous provisions. After a careful review of the subject when the bill was passed, we were unable to find any way to overcome the difficulties with which we were confronted, and with the approval of the shareholders withdrew from the business and sold the ships.

"You refer to a reported dinner-table discussion in December, 1913, between the Surveyor of Customs at San Francisco and Mr. Schwerin (which, however, differs so much from the latter's opinions often expressed to me, as to raise grave doubts as to the accuracy of the reporters' memory), and to excerpts from what Mr. Schwerin said before a committee of Congress in 1913, about the Panama Canal act, and argue that he ascribed the withdrawal of our Oriental service to the Panama Canal bill, the provisions of which were not applicable to that line of ships. It clearly appears even from the excerpts contained in your letter that Mr. Schwerin meant that the Panama Canal bill would put Pacific Mail out of business 'so far as the Panama route is concerned, by law.'

"You reiterate that Pacific Mail withdrew from trans-Pacific business because it was unprofitable in years past, but you cannot deny what every one knows, that conditions had changed at least a year before the withdrawal and had become profitable and the prospects for the future most favorable.

"If Pacific Mail persisted in the service during poor years, it would certainly not have abandoned it when the good year had arrived and others were in sight, except for the sole compelling reason. Shall we look for that reason in the Panama Canal act, which did not interfere with the business in the least, or in the Seaman's bill, which imposed upon it most burdensome restrictions? According to the press, the same restrictions have been assigned by Mr. Robert Dollar and Mr. J. J. Hill as the cause of withdrawal of their ships from the Pacific. Are these gentlemen knaves or fools, to either conceal or not to know, as you do, that the Panama Canal act and not the Seamen's act was the real cause of withdrawal?

"Finally, you again complain because Pacific Mail did not wait to see how you would construe away the noxious provisions of the law.

"The law speaks for itself. The men who advocated and the men who made it worded it so as to carry out their intention to effect a change in existing conditions. The Seamen's Union worked strenuously for its passage with that end in view.

"Let us see what they sought:

"In the hearings held before the committee on Merchant Marine and Fisheries of December 12, 1911, Mr. Macarthur, editor of the Coast Seamen's Journal, says: 'This bill is designed to get rid of these aliens in tongue, color, instinct, and everything else and to replace them with Americans.' P. 31.

"'But the purpose of this bill is to prevent the shipment of Chinese crews on American vessels.' P. 34.

"Mr. Andrew Furuseth, president International Seamen's Union, says: 'A vessel that has that kind of a crew (Chinese) is so utterly unseaworthy that she is not only a danger to herself but to every class of vessel that she meets.' P. 95.

"Thus the legislators: 'Congressional Record, proceedings, Oct. 2 to 28, 1913.'

"Senator Fletcher: 'I think that provisions in Section 12 of the proposed substitute, requiring that 75 per cent. of the crew in each department understand the orders of the officers, is not so much intended to promote safety at sea as it is to affect wages and prevent employment of Asiatic seamen on the Pacific.'

"Senator Burton: 'The committee thought the adoption of the provision as it stands in the substitute would drive our flag out of the transpacific trade. What would be the result of adoption of this provision? The six boats engaged in business on the Pacific no doubt would be forced to withdraw.' P. 58.

"Referring to the language test section: The law requires the collector of customs upon the sworn complaint of any reputable citizen that the section is not complied with (which may be at

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any time up to six hours before the departure of the vessel) to cause the muster of the crew to determine the fact. You are powerless to change the law or to control the action of members of the Seamen's Union, who are all 'reputable citizens.'

"It is easy, however, when the lines of the Pacific Ocean have ceased to be to give instructions which apparently take the teeth out of the law.

"Perchance you have not read of Mr. Wm. F. McCombs, chairman of the Democratic National Committee, which appeared in the New York Sun of Nov. 4: Thus, 'I believe that the La Follette law should be repealed.'

"I have investigated carefully and I believe the bill puts unwarranted burdens upon the shipping interests."

"It is pleasant indeed, Mr. Secretary, to note your satisfaction over the fact that the stockholders have received a good price for their ships. It is due to the accident of the war, however, and not to the Seamen's bill, that the abandonment of commerce on the Pacific Ocean to foreign-owned lines of steamships was not accompanied by disastrous financial loss to American corporations and their stockholders."

Interior Decoration of Vessels

By Harry B. Etter.

Read at the twenty-third general meeting of the American Society of Naval Architects and Marine Engineers held in New York, November 18 and 19.

In working out a successful design for a vessel's interior a great many things should be considered, and care should be exercised not to have the decoration of adjoining public rooms so one will shock the other. All should blend together like one complete thing and yet not be alike. Other things to be considered are: First always, meaning; followed by balance of line, light and shade, repetition, variety of surface, choice of material, contrast and harmony of color and suitability for the trade the vessel is to engage in.

Exquisite form and proportion must be gained by extreme simplicity of beauty of line in the division of a wall surface into a series of panels, borders and mouldings, separated by pilasters, columns and other architectural forms.

Simple designs well proportioned are an attraction in themselves, and an excess of elaboration should be carefully avoided. Mixture of styles do not always secure the best results. Ornaments, if used, should not attract the eye to the exclusion of the background as if it were an entirely separate part, but should be subservient to the general effect.

Furniture, upholstering, draperies, etc., should be carefully selected to harmonize with the style of the room. Too often is this neglected and a truly beautiful room spoiled by unsuitable furnishings. The designer of the decoration, if he knows his profession, can be and should be consulted in regard to all details, as he can picture in his mind what such things should be as he progresses with his work.

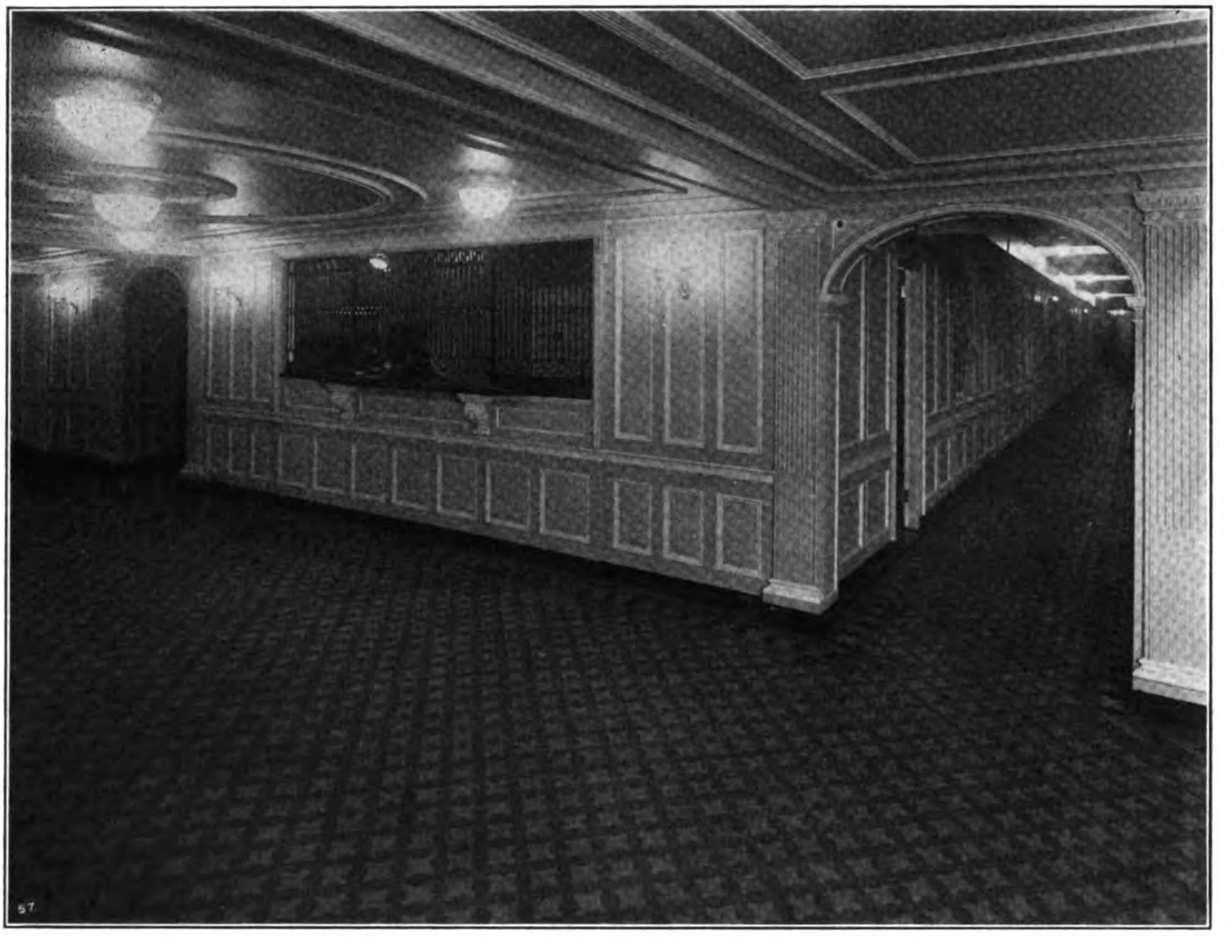
The interior decoration of a vessel is very often unsuited for the climate she is to trade in. The writer was once called upon to look over a steamer engaged in tropical service to see what could be done to improve her. I found the smoking room "a Black Hole"—everything dark, gloomy and hot looking. The other public rooms were not much better—mahogany everywhere. Why is it so many shipowners insist on mahogany or oak-panelled walls when we can get so much better results from delicate tints? In the first place, hardwood walls kill the furniture; they absorb the artificial light also, for no matter how brilliantly a vessel may be lighted there are always deep shadows and dark corners. Light colors are cheerful; they reflect the artificial light and make a good setting for rich furniture besides. Of course there are cases where light tints would not answer. A smoking room, as we all know, would not do to be decorated like a ballroom, yet we need not have it dark and gloomy.

While we do not want hot-looking dark rooms for tropical climates, but something cool and airy, just the reverse may be said for vessels engaged in the colder regions. Here we want to feel warm and comfortable.

If a period of decoration is to be adopted we should stick to it not only in line but in colors and material, and not fly off in the middle of it to suit some individual taste.

As smoking rooms are mostly always finished in oak, some of the sixteenth century English or Flemish styles always look well and make an agreeable change from the lighter and gayer styles employed for a music room or lounge. For outside rooms, such as a veranda or enclosed promenade deck, palm room and the like, a garden effect with trelliage panels can hardly be improved upon. Stateroom corridors and alcove passages as plain as possible are better than a lot of small panels and fancy mouldings. The best example of stateroom corridor I have ever seen was on the Cunard line steamer "Aquitania." Here panels were eliminated entirely. The walls were built of tongued and grooved planks finished

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Corridor treatment on the steamer "Northern Pacific."

smooth and covered with a light canvas stretched on and painted, with pilasters at doors and corners only. They looked very neat and were doubtless much cheaper to build and keep in good order than paneled walls. Stateroom division bulkheads, if also built this way, would make all four walls alike in the room. Panels never work in well around berths and other numerous stateroom fittings. There are some of the suites on the "Aquitania" where these walls are papered like the rooms of a house, and they look very nice.

We do not need to have carving or ornaments to make a thing attractive. To begin with, carving is a dirt collector, and unless one can afford to have it well executed it had better not be attempted. The H. P. Whitney yacht—at the time of writing this paper building at Cramp's—it would be well to mention, is entirely devoid of carving or ornament, everything depending on the simple lines of the panel work which, together with the beauty of the woods used, the hardware, lighting fixtures and furnishings of every kind to correspond, is going to be very much of a success for a vessel of her type. I have often wondered why in yacht work, when smallness of space usually requires joiner work to be as flat as possible, Marquetry is not used more. Here we usually have hardwood walls, mahogany or walnut, and a beautiful effect can be had with large, flat panels with a narrow border of satinwood, maple or some other silky grained wood inlaid an inch or so from the edge, set off with the straight lines of Sheraton or Hipplewhite furniture, which is usually inlaid. The ceilings of such a room could be a light tint, harmonizing with the inlay, contrasting the dark wood and lightening it up.

Proportion is another great consideration. As the deck heights are usually too low, the walls should be designed to deceive this and give the impression of height. Cornices and mouldings should have a defined profile. Neither should they be too intricate, for, as it often happens, the forecastle hands may have to paint her some day, and they are more inclined to finish quickly and leave no "holidays" than to make a careful job, so pile the paint on thick, which soon clogs the mouldings and spoil their beauty. The bed mouldings of cornices can be enriched if more elaboration is desired. Egg mouldings, dentil courses and the like are rich, pleasing and in good taste, and, as they are inverted, do not collect dust. These, however, should be well above the eye line to have a good effect.

If a hung type of ceiling be employed—that is, one framed under the deck beams—it should be carefully treated. Here we usually have a large unbroken area, and a fine effect can be had with some elaboration. Hardwood paneled ceilings are

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becoming a thing of the past, and those of an ornamental plaster effect show a vast improvement. The more common way of casing in the beams and forming panels between them, which for some styles would answer very well, is usually productive of too heavy an effect. The steel deck beams are generally too large and spaced too close together for proper architectural proportion, and, besides, it happens at times that where a steel beam has to be reversed for structural purposes they cause an unequal width of the panels.

There are many difficulties to be dealt with in interior ship decoration, caused by the shape of the vessel, the structure, the crown of the decks, the sheer, the low deck heights and the smallness of the air-ports and deck-house windows.

The shape of the vessel necessarily has to stand, as well as the structure for the most part. But here many of the difficulties caused by the structure could be avoided if those in charge of the structure and decoration would work together and a little flexibility exercised together with a little judicious scheming. Stanchions, girder lines and web frames can almost always be placed to suit architectural requirements without sacrificing the strength of the vessel.

One of the greatest difficulties to a good architectural effect is the crown of the deck. This does not add to the strength of a steel vessel, and, except for the weather deck or a deck affected by freeboard regulations, could be made flat. In fact, the weather deck of the American line steamers "St. Louis" and "St. Paul" was made flat, but is the only case I ever remember seeing. This crowning of the decks prevents horizontal lines, so important to architecture, and spoils many good architectural details if they happen to come off the center line.

The sheer of the deck can hardly be avoided in most vessels, and, not being so severe as the crown, does not do so much harm to the design.

The low deck heights, being all out of proportion to the size of the average room, are hard to treat and require resourcefulness unless the public rooms are under the boat deck. The writer had the good fortune, when about to design the interior of the steamers "Great Northern and "Northern Pacific," recently built by William Cramp & Sons, to have also worked out the preliminary arrangement of these vessels, and was enabled to form in mind at the same time the scheme of interior decoration, which made it much easier to carry to a conclusion than if several persons were engaged at different times for the different parts.

In these vessels the public rooms, except the dining saloon, were all on the promenade deck, and, by following the type set forth by most foreign-built liners of carrying the deck houses above the level of the boat deck, we had a good proportionate height in comparison to the size of the room. The dining saloon, which was on a lower deck within the hull, was made 10 feet high by making this the deck height throughout the length of the vessel. This height answered very well, considering that this room was a very large one.

As these vessels were treated throughout, except the smoking room, in the Colonial style I was enabled to have fan lights over doors and windows, arches and other details so characteristic to this period of design. The lofty appearance of these rooms was greatly improved by placing the chair rails as low as 30 inches above the floor, making the upper panels of good length.

That ship decorators appreciate more height to a room on shipboard is shown as far back as the steamers "City of New York" and "City of Paris," now the "New York" and "Philadelphia" of the American Line. The dome over the dining saloon of these steamers was the beginning of a new era and has been followed out with many improvements ever since. On some of the large liners built abroad in recent years we find some of the public rooms carried up two deck heights. Of course this takes up valuable space that could be used for staterooms, and, unless the vessel is a very large one, could hardly be afforded by most owners.

Most of the Long Island Sound and Hudson River steamers have had the large central well as far back as one can remember. The walls were always treated alike on the several decks in view, which spoiled the effect. In the steamer "Commonwealth" great improvement was made in treating the two heights in the Venetian Gothic saloon more like one height.

If the deck heights will permit it, a good practice is to hang the ceiling under the beams before mentioned, with large panels and false beams to suit the design of the room. With the hung ceiling it is possible to carry ventilation ducts, pipes, electric wiring, etc., above it and out of sight, to which access can be had where desired by having some of the panels made so that they can be taken down without disturbing the remainder of the work. With a ceiling of this type it can be better treated to suit the period of design chosen for the room and will also serve better to reflect electric lighting by avoiding the deep shadows between the beams.

Airports and deckhouse windows, by the smallness of the openings, usually form a problem hard to treat. The inside sash sometimes employed helps matters a great deal. This method was used in the dining saloon of the "Great Northern" and "Northern Pacific," the sashes behind the airports being glazed in a glass known as satin finish, which broke the outlines of the airport and

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The dining room, steamer "Northern Pacific."

gave the effect of large Colonial windows. Of course it has to be admitted that when the sashes have to be opened the good effect is somewhat lost and the draperies have then to make up for it. The promenade deck of these vessels was enclosed for the length of the main public rooms and large house type windows were used for those rooms. But we are not often so fortunate as on the steamers mentioned and have to use other schemes. Ports and windows, if worked in pairs, can be treated as a large double window and look better than if spaced singly and equally distanced all around the walls as so often seen. On the Whitney yacht before mentioned very large plate glass windows are introduced in the deck houses. These large windows are arranged to suit the interior of the rooms and are a very great improvement over the pigeon-hole type more often used. This yacht, it may be well to remark, is one of the cases where the decorator and the constructor have had to work together from the beginning.

With the height of large steamers above the water it is possible to employ large metal-framed windows especially designed to suit the interior. This is being done on most of the transatlantic lines with great success when the location is not too much exposed to the elements.

Painting for period design always looks very much better flat finish or at the most a slight egg-shell gloss. Very glossy surfaces throw off glints of high light very trying to the eyes. Too many colors should be avoided; the different shades of a color show the better taste.

Soft lighting effects are the cry of the present age, and the light bulbs, if covered with globes of the many artistic designs manufactured, will produce this effect. As vessels' saloons are rarely high enough for indirect lighting, the wall bracket can be used to a great advantage. The wall brackets, properly designed, have a rich effect and work in well with most architectural designs and are not hidden behind beams and girders, producing shadows like ceiling lights would; that is, when the ceiling is not hung or made flush.

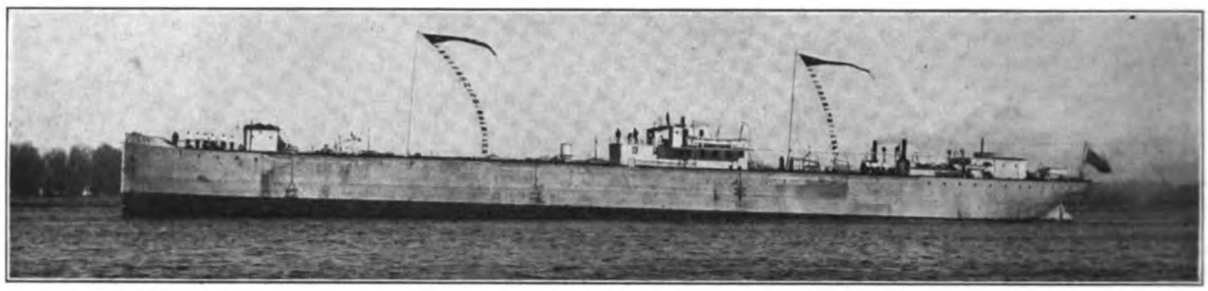
When ornamental glass panels are fitted at the ceiling level of skylights, or in dome skylights, the lighting of the room is always greatly improved if lights are fitted behind them. Otherwise the skylight makes a black patch at night and puts the whole middle of the room in shadow. The writer believes that the light should come from the same direction by night as by day.

With the upbuilding of the American merchant marine, if that good day is about to arrive, let us hope that the conditions will so improve that we can turn out a vessel second to none from an artistic as well as from a mechanical viewpoint.

The comfort and beauty of the interior of a passenger vessel are, after all, the main attraction to the traveler, the same as such things are in a hotel to the guests or in a clubhouse to the members where nothing is spared to make them a success.

The "Camino" has been sold by Swayne & Hoyt to Barber & Co. of New York and is to load a general cargo from there to France. This vessel acted as San Francisco's Belgian relief ship, and since that time has been on the east coast, her latest venture resulting in her being blocked by the slides in the canal, disposing of her coal cargo to the canal authorities and returning to New York. She was built by the Craig Shipbuilding Company in 1912 and is 296.5 feet long, 43.9 feet wide and 28.5 deep.

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Shipping Notes

The Swedish-American line has purchased its first steamer for the new service between Goteburg and New York. This vessel is the former Holland-America liner "Potsdam," a vessel 550 feet long, 34 feet draft, 15½ knots speed and 22,070 tons displacement. She has accommodations for 275 first, 225 second and 2,000 steerage passengers. As the depth of water at the Goteburg quays is only 28 feet, the "Potsdam" will have to unload with lighters until extensive dredging has been undertaken.

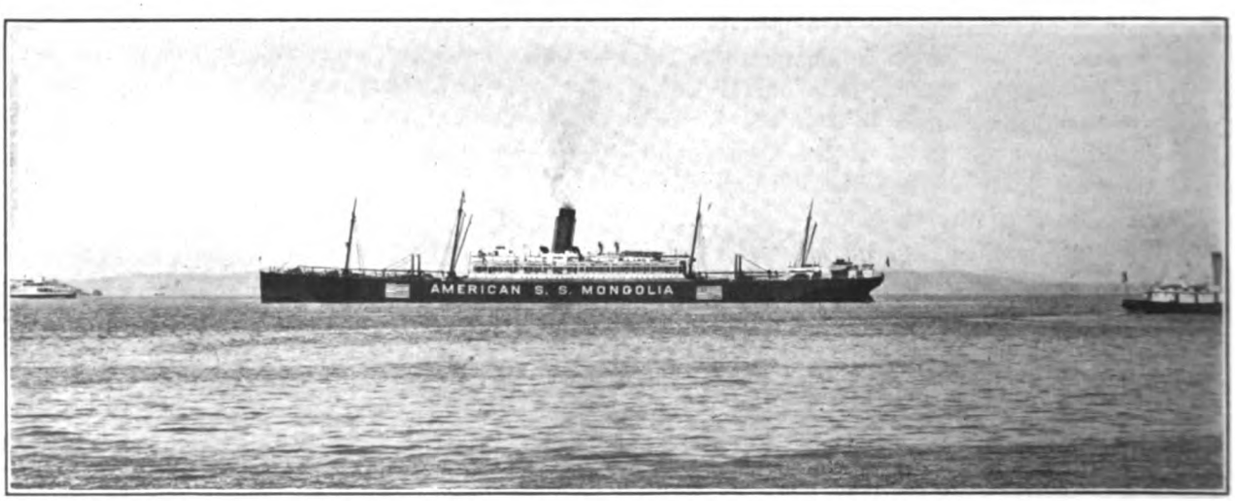
The Steamboat Inspection Service has made a ruling that the hatches of all ocean and coastwise vesels be fitted with hatch covers and has specified the class of fastening for the same.

The Danish East Asiatic Company has organized a subsidiary concern to take over the management of its steamers. The capital of the new company is $2,680,000 of which the East Asiatic Company has taken 50 per cent. The steamers to be operated by the new concern are the "Natal," "Rhodesia," "Transvaal," "Kina," "Arabien," "Indien," "Transquebar," "St. Croix" and two 7500-ton steamers just completed. The big fleet of motor ships so well known along the west coast will still be operated by the East Asiatic Company and it is believed the parent concern will confine itself to the operation of motor ships exclusively in the future.

Mr. Philip Manson of New York has concluded arrangements for the organization of the Pacific and Eastern Steamship Company whose avowed purpose is to operate steamers between China, the Philippines and the east and west coasts of the United States. The concern is a New York corporation and starts business with a capital of $2,000,000. The directorate is composed of four Americans and three Chinese. The president of the new concern is John Mitchell, Jr., who is also president of the Washington and Southern bank of Washington, D. C. Mr. Philip Manson is managing director. The concern is to buy or charter steamers. The head offices will be New York and Shanghai.

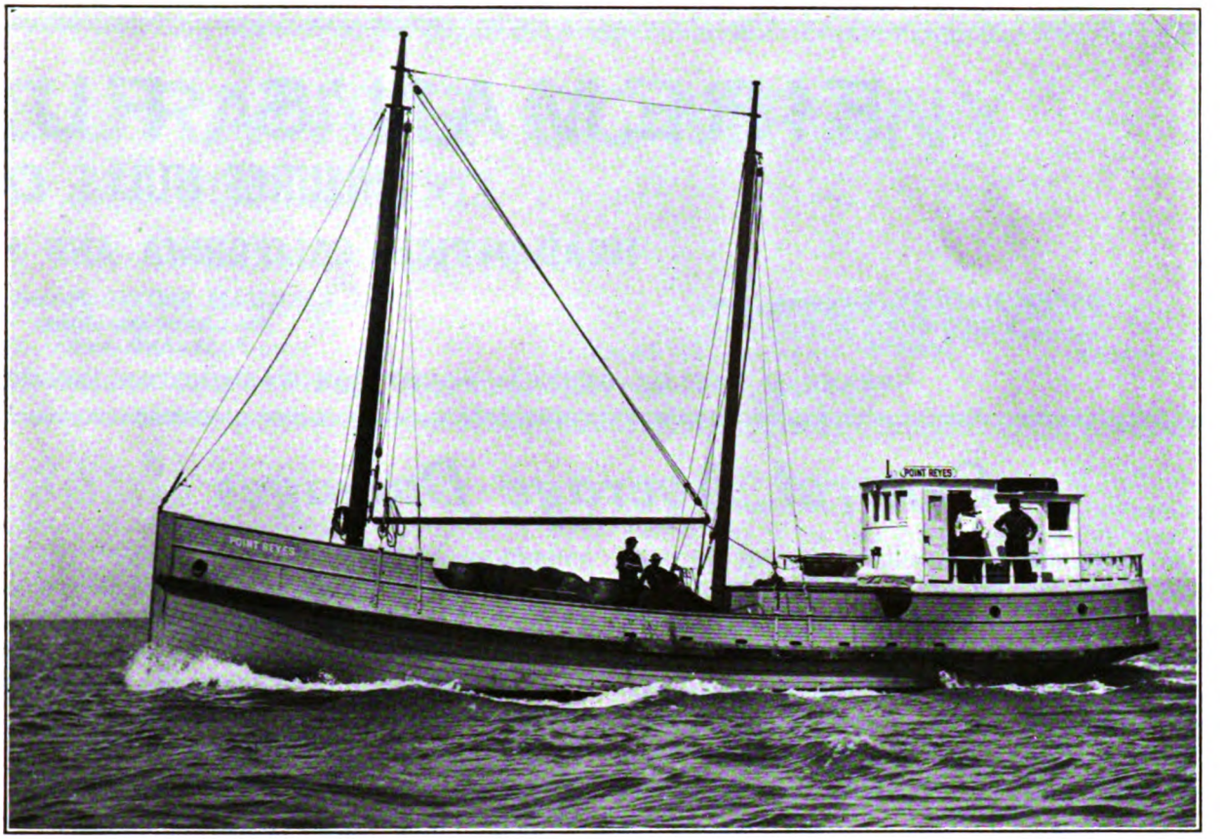
Japanese and Chinese firms have figured heavily of late as purchasers of Australian shipping. Among the vessels lately changing hands were the "Wollowra," "Hauroto," "Brisbane" and "Moura."

The Briggs Bituminous Composition Company has secured contracts recently for coating over 800,000 square feet of metal surface. Among the vessels figuring in this large amount of work are four tankers for the Standard Oil Company building at the New York Shipbuilding Company, four tankers for the Texas Oil Company now building at Fore River and three large tankers for the American Molasses Company at Fore River and



The final departure of the former Pacific Mail liner "Mongolia" on her way to Europe.

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The "Point Reyes," a sturdy little freighter powered with an 80-horsepower Corliss engine.

in addition a large tanker for the Huesteca Petroleum Company building at the New York Shipbuilding Company.

A number of tests have recently been carried out by the Canadian Government on the new dry dock at Prince Rupert. This big floating dock is built in three sections and has a total length over keel blocks of 604′ 4″. The sectional construction enables the economical handling of small vessels. One section consists of six pontoons and is 269 feet long, the other sections are 164 feet long and made up of three pontoons. During the tests the three sections were joined and sunk till there was 26 feet of water over the keel blocks. The pumps were then started and the dock was brought to normal flotation in forty-five minutes. The first vessel to utilize the new structure was the steamer "Delhi," which was wrecked on the Alaska Coast over a year ago, raised and towed to Prince Rupert. This dock together with the accompanying power houses and shipyard were described in previous issues of THE PACIFIC MARINE REVIEW.

A special dispatch to the "Christian Science Monitor" of Boston, in part, says: "The fact is generally accepted in Washington that in the speech of Secretary McAdoo at Indianapolis, on October 12, he voiced the administration program on the subject of the form of legislation that will be urged upon the Sixty-fourth Congress to take the place of the shipping bill that failed last session. It is a program that allies the national defense problem and that of the merchant marine. Politically it is counted upon by the Democrats to win over many Republicans." The dispatch further states that the ideas expressed in Mr. McAdoo's speech "were not original with him or with the administration, but is the thought of Bernard N. Baker of Baltimore."

The Board of Directors of the San Francisco Chamber of Commerce have approved a number of changes to be recommended in existing merchant marine laws. Among the important recommendations are that the English system of measurement be adopted for American ships and that the Danube measurement be used for the Panama Canal. The recommendations are being drawn up in the form of a bill and will probably be presented to Congress in December.

The Delaware, Gulf and Pacific Transportation Company, through Fawkner, Currie & Company, have announced that they will place three steamers on the New York-San Francisco-Puget Sound route as soon as the canal is reopened.

The Marine Oil Engine Company is the name of a new corporation formed under the laws of New York for the purpose of carrying on a consulting and advisory engineering business with the object of pushing the interests of the oil engine in the United States. The moving figure in the new corporation is Mr. W. R. Haynie, U. S. representative for the Bolinders Company of Sweden.

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General Average Damages

IN a recent decision handed down by the District Court for the Southern District of New York, Mayer, District Judge, opens his opinion with the following sentence:

"The controversy here to be determined is both novel and interesting, and counsel agree that there are no cases to be found in the books in which the question under consideration has been presented or discussed."

The case is certainly interesting, but is novel only in that there could be found no precedents in the way of legal decisions. The probability is that the question involved was considered to be no question at all until the defendants in this particular case decided to test it even to the extent of resisting it at court.

The question arose as the result of a collision between the steamers "Aristea" and the "Groningen," and in a suit to recover damages both steamers were found to be at fault and condemned each to pay half the damages of the other. The damages to the "Aristea" were fixed at about $20,000 and those of the "Groningen" at about $35,000, and settlement was made by the owners of the "Aristea" paying to the owners of the "Groningen" one-half of the difference between these amounts.

The bills of lading of the "Aristea" contained the usual negligence general average clause whereby the owners of cargo were bound to contribute to general average expenses and sacrifices even though the cause giving rise to the general average was the negligence of the master or crew. After the collision and before the conclusion of litigation as to the fault of the colliding steamers, a general average statement was prepared in connection with the "Aristea" and her cargo and contribution was made by the cargo to certain expenses incurred by the owners of the steamer which were of a general average nature. Cargo owners collected from their underwriters and subrogated them to all rights of recovery.

The damages as fixed for the "Aristea" included many of the items which had been included in the general average statement and to which the cargo owners had contributed by reason of the terms of the bills of lading and after settlement had been made as between the "Aristea" and the "Groningen" following the decision of the Court, claim was made against the owners of the "Aristea" for the proportion of such expenses as had been recovered by them and to which the cargo had contributed.

The "Aristea" was on a voyage from Karachi, India, to London and Hamburg. She arrived at London, where she discharged a part of her cargo and was on passage down the Thames towards Hamburg when the collision occurred, and she was obliged to return to London as a port of refuge. The general average statement was drawn up in Hamburg. The litigation as to the liability for the collision and the decision arrived at was in London, and the suit for recovery by those interested in the cargo was brought in the United States.

In the course of the decision the Court said:

It is immaterial whether the general average adjustment was governed by the law of England (the collision having occurred there), or of Germany (the average adjustment having been made there), or of the United States (this being the forum of the present litigation), for in each jurisdiction general average is payable by cargo, notwithstanding negligence of the ship, if the charter party or bill of lading contains a clause (such as here) exempting from negligence.

After a review of the laws of England and Germany, the Court continued:

The collision, however, having taken place in English waters, the rights of all concerned in respect of damages arising from the collision depend upon the English Law. The rules applicable both to vessel and cargo are stated by Carver in his Carriage by Sea (5th Ed.) at page 922 et seq.

Under the English law applicable to a "both to blame" case, cargo, though innocent of fault, may recover only one-half of its damages from each of the two colliding vessels, although in the United States the entire damage may be recovered from either vessel. "The Beaconsfield," 158 U. S. 303, 15

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Sup. Ct. 860, 39 L. Ed. 993; "The Atlas," 93 U. S. 302, 23 L. Ed. 863.

Bearing these rules in mind, the situation is that, on account of damage loss and expense sustained by the "Aristea" because of a collision, the owners of cargo shipped on her were obliged to contribute to her loss. The cargo owners could collect one-half of the physical damage to their cargo from the "Groningen," but they could not collect anything from the "Aristea" because of the "negligence" clause. The "Groningen" and the "Aristea" having paid each to the other one-half of the other's damage (by settlement of account), and the "Aristea" having thus received back from the "Groningen" part of the loss for which the cargo owners had contributed to some extent, the cargo owners now ask that the "Aristea" return to them their just proportion.

Primarily, it is well to dispose of two contentions urged against recovery: (a) Because in the settlement of collision damage the balance was against the "Aristea," and therefore she was required to pay the "Groningen" an amount over and above that which the "Groningen" was called upon to pay her; and (b) because the account between the vessels was settled and closed and cannot now be reopened.

As to (a), it is clear, on principle, that it is of no consequence how the account is settled, or in whose favor the balance stands. If A. owes B. $100, and B. owes A. $25, and, in settlement, A. pays B. $75, it seems elementary that, although A. must pay B., he nevertheless received the equivalent of $25.

(b) There is no question akin to an account stated. The correctness of the general average adjustment, or its constituent items, is not questioned nor attacked. The fact that the general average contribution is paid does not make any difference. A court of admiralty acts as a court of equity (O'Brien v. Miller, 168 U. S. 287, 297, 18 Sup. Ct. 140, 42 L. Ed. 469), and in equity the transaction is not finally closed until complete justice is done.

So, likewise, it may be pointed out in the case at bar that, by whatever name the principle may be called, fair dealing requires that the "Aristea" shall return to the cargo owners that which was contributed and for which the "Aristea" has been reimbursed. If, for instance, the "Aristea" had first collected half her damages from the "Groningen," and then sought to collect the entire amount of the same items by way of general average contribution from the cargo owners, she certainly would not have found any support in the courts upon any theory in the maritime law or in equity.

The morale of the sea demands that the master shall think only of the right thing to do. Johnson v. Chapman, 19 C. B. (N. S.) 563; "The Star of Hope," 9 Wall. 203, 19 L. Ed. 638. There may often be cases where the judgment as to fault of collision may be pronounced long after the general average is adjusted, and if masters know that the ship may benefit at the expense of the cargo, it is but human that, from loyalty to their owners and in the excitement of a perilous moment some may act for the benefit of the ship to the detriment of the cargo. "The moral tendency of the well-known commercial usage is to induce the master to exercise an independent judgment in the emergency for the benefit of all concerned." "The Star of Hope," 9 Wall. 203, 19 L. Ed. 638. And the result thus hoped for is as important as the just settlement of controversies arising out of a disaster.

The conclusions here arrived at have support in the practice of average adjusters, as testified to by Mr. Brengle, an average adjuster of large experience. While Mr. Brengle's testimony is not binding in this case, it is useful as argument, and as such is of some persuasive value. And, further, as the case is one of first impression, it is unnecessary to speculate how the question might be disposed of in other jurisdictions, although I am unable to find anything in English or German law inconsistent with the view here expressed.

The decision of the Court was that the libelants, cargo owners or underwriters, were entitled to recover from the owners of the "Aristea" their proportion of one-half of the damages which had been paid and contributed for and which were recovered from the "Groningen." Reported in 222 Fed. Rep. 994.

The big steam yacht "Cyprus," built in 1913 by the Seattle Construction & Drydock Company for Colonel D. C. Jackling, has had four life-boats equipped with Rouse patent sea anchors and oil attachment. The large size anchors of this type contain six gallons of storm oil and will last 33 hours in heavy weather. In this connection it is interesting to note that many merchant vessels on the Pacific Coast have adopted this practical device. Among these are the San Francisco & Portland Steamship Line, which has equipped all its life-boats with Rouse anchors and oil attachment, while 400 of these anchors have also been supplied to life-boats of the U. S. Army Transport Service. This invention has been thoroughly demonstrated before a board of U. S. Supervising Inspectors off Sandy Hook with a Lundin life-boat, when it was found efficient in every particular.

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European Marine Notes

[From our own Correspondent.]

London, Nov. 10, 1915.

Greek Crisis and Panama Canal Slide.

OF the numerous recent occurrences which have tended to send up shipping freights to a record level, two stand out with special prominence. One is the Greek political crisis, which has led to the recall by the authorities at Athens of almost the whole of their mercantile fleet in foreign waters, with the result that the scarcity of tonnage already existing in the Mediterranean has been greatly accentuated. The other influence is the suspension of passages through the Panama Canal, owing to a "slide" in the Culebra Cut, which, we understand, is not expected to be cleared away until the beginning of next year. However unpleasant the official warning may be, owners and merchants will much prefer to have it than that, in the vain hope of an early reopening, an immense amount of tonnage should be allowed to idle at the entrances. An owner with a ship from the North Pacific waiting at Panama to pass through the canal will, as long as there is any real hope of an early reopening, naturally hesitate to divert her, when he knows that to send her around the Horn means the prolonging of the voyage by a month at the cost of $25,000 or $30,000. Similarly, owners want to know the facts before incurring all the expense of diverting ships now waiting at Colon en route for Australasia and the Far East to the Cape of Good Hope and Suez Canal routes, respectively. When these pressing decisions have been made the question of the effect of the breakdown of the canal on United States trade remains. The opening of the Panama route was a distinct encouragement to American trade with the Far East and Australasia. The liners took only 43 days for the voyage from New York to Japan through the Panama Canal, as compared with 51 days via Suez, and 61 days via the Cape of Good Hope. From New York to Wellington via Panama was 8,500 miles, as compared with 11,500 miles via the Cape Horn route. It is, of course, specially unfortunate that the breakdown should occur at a time when, owing to the short supply of tonnage, saving in time is of great importance.

How They Affect Freights.

As a result of these two incidents freight rates on nearly every route have undergone a further advance, and have now reached a level which is causing serious searchings of heart among shippers all over the world, and particularly among coal owners. Such a famine of tonnage as now exists has rarely been witnessed before, though it may have been approached on previous occasions, and fears are entertained in many quarters that under the serious handicap of existing freight rates the world's shipping business must be severely hampered. This view will probably be justified by events, for the requirements of the British Government in regard to mercantile tonnage are not yet wholly satisfied, while recent developments in the Balkans leave no room to doubt that the merchant fleets of the Latin nations of Europe will be drawn upon heavily in connection with the war. At the same time the movement of the world's crops from the centers of production to their customary markets must go on, whatever happens, and it may, therefore, be inferred that shipowners will not have any very great difficulty in making their customers bear the whole of the increased cost of ocean transport under the abnormal conditions now prevailing. In these circumstances, those who have to pay the high charges now ruling for transshipment of their goods between one country and another should refrain from assuming that the shipping companies are making extra profits until there is ample evidence that this is the case, for, as a matter of fact, most shipowners are feeling acutely the scarcity of labor and high prices of coal which have been brought about by the European crisis, and are not likely to benefit to any great extent from the enhanced level of freight rates now ruling.

Liner Companies and Dear Coal.

Liner companies, with their fast and regular services, are finding the cost of bunkers an in-

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creasingly formidable item in their voyage accounts. In time of peace chairmen of leading lines were accustomed at the annual meetings to refer to the cost of coal as an important part of the working expenses, but they never had to deal with such extraordinary prices as have now to be paid. British collieries have now plenty of steam coal to dispose of, and the merchants want to take it, but, owing to a variety of reasons, there is not at the moment a sufficiently ample supply of tonnage available to carry it. The recent rise in freights has been merely due to the supply falling short of the demand. How big the rises generally have been is illustrated by the fact that a month ago the freight from South Wales to Port Said was $7.50 per ton; this week $11.25 has had to be paid, though $10.60 was accepted on October 7th. The September rate seemed remarkable enough as it certainly was when compared with a pre-war rate of about $1.75. Little more than a month ago the freight to the lower Plate was $5.36; on October 8th it was $10. In five weeks the freight to the Cape Verde Islands has risen from $5 to $8.75. And no merchant is prepared to say that the maximum has yet been reached. Owners might perhaps do something to help the situation by taking advantage on every occasion of the attractive freights to this country and then letting their vessels earn the magnificent outward rates by loading coal here. A round trip of this kind should be at least as profitable as, and certainly more beneficial to this country than, some of the voyages from North America with grain and then back to the United States in ballast. The great majority of owners would probably willingly see the coal freights on a lower level.

High Cotton Freights.

The demand for steamers to bring the American cotton crop to Europe has been expanding, and freights, which are high compared with those current before the war, have been freely paid. For a vessel of moderate measurement $36.25 per net register ton has been paid for the voyage from Savannah to Liverpool, as compared with, perhaps, $13.75, which would have been accepted two years ago, while for the voyage from the Gulf ports to Havre as much as $47.50 has been ceded, together with a guarantee of fixed days for loading and discharging. But comparisons of cotton freights are never complete unless comparisons of the vessels are also included, since, cotton being light, much depends on the cubic capacity per registered ton.

The Government and Shipping.

In tackling the high freight problem shipowners clearly must look to their own ranks to discover a solution. The British Government has done little more yet than intimate to the owners that a solution is desirable, leaving the suggestion and consideration of remedial measures to the industry itself. This is really as it should be. The problem is an exceedingly complex one, and the close relations of owners with Government departments during the past few months have not induced the feeling that any considerable increase in State control of the mercantile marine would be in the interests of efficiency. The management of many hundreds of requisitioned vessels has thrown an exceedingly heavy burden on a single department, and, as far as the services to the Fighting Forces are concerned, owners have no doubt that the work has been highly successful. But it may be doubted if the Admiralty Transport Department would attempt for a moment to defend its measures on economic grounds. First-class passenger liners have been used to carry rough cargo, and first-class cargo vessels have been employed for weeks on end as coal hulks in a way which no owner with an eye to the remunerative conduct of his business could possibly countenance. The methods of requisitioning vessels for Government service have, in many owners' opinion, often caused unnecessary disturbance to freight markets. Probably the first suggestion British owners would make in order to get the most out of shipping would be that more use should in future be made of the expert knowledge available in the management of the shipping now in Government service. While, therefore, the intimation that steps should be taken to give some relief from the present high freights comes properly from the Government, it is for shipowners themselves to consider how the object could best be achieved.

An Old Sailing Ship.

The fate of old ships has always made an interesting chapter in the romance of the sea, and the torpedoing of the barque "Actie" on her way from Krageroe to Leith with a cargo of props snaps a curious link with the great days of the sailing ship. Not that the "Actie" was ever a famous craft like the "Cutty Sark"—the rediscovery of which a year or two since in the obscure drudgery of tramp-work attracted not a little attention to her quaint vane and elaborate figurehead. But the "Cutty Sark" was a young thing to the "Actie," which was turned out of the Bath shipyard in Maine nine years before the launch of the "Cutty Sark" at Dumbarton provided the Aberdeen clipper "Thermopylae" with a rival to the claim to be the fastest ship that ever sailed the seas. The "Actie" was built as far back as 1860—the year that saw the final triumph of the British clippers in the abandonment by their American rivals in the China trade of the great annual tea race. It was the year of the building of the "Fiery Cross" and the "Flying Spur"—great names in the annals of British ship-building.

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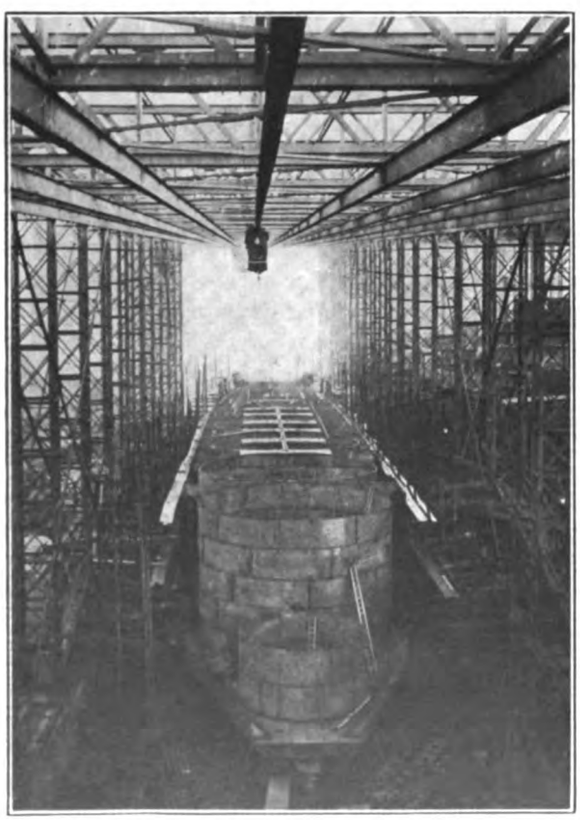
What the "Actie" did in those far off but lustrous days one does not know, but it is at least something that she came from them, and that for fifty-five years she had kept the sea. It was urged in certain quarters in old days against the American ships that their light construction and soft woods made them short-lived when they were hard-driven as the manner of the time was. The Maine builders of the "Actie" must have put good work into her if much of her original timber survived. Anyway, it is a weird fate—this of the old relic of great sailing times plodding patiently along between Krageroe and Leith (Scotland) and finding her end at the hands of a German submarine in the war of Armageddon!

Our Illustration.

I give with this article a photograph of a 8500-ton deadweight vessel recently built here by William Doxford and Sons of Sunderland, England, for carrying oil in bulk. The photograph shows the vessel in course of construction and the patent system is clearly shown. The oil is carried in large vertical cylindrical tanks, thus keeping the oil off the hull of the ship. These tanks can be removed if it is desired to convert the vessel into an ordinary cargo ship.

British Yachts for Foreign Royalties.

The Bulgarians have not many sea-going warships, but of the few they have they endeavor to make the best possible use. Their most modern unit—the Nadjezda, a French-built twin-screw vessel of 703 tons displacement—serves, for example, as torpedo gunboat, training ship, and royal yacht. One or two of the other vessels are iron paddle steamers of a type which was very popular with royalties in the sixties of last century. The more notable were built on the Thames, chiefly by the famous Samudes. The Emperor Francis Joseph's "Mirama" is one of these. So is the Khedive's "Mahroussa," although nine years ago she was, under the direction of Sir John Biles, transformed by Messrs. A. and J. Inglis, of Pointhouse, into a triple-screw ship driven by Parsons turbines. The Turkish royal yacht is modern, but in what used to be the Sultan's fleet are three large British-built paddle steamers, the "Stamboul," the "Fuad," and the "Izzedin." They belong to the same period as the "Mahroussa." The King of Greece's yacht, the "Amphitrite," is a similar ship. She was built at Birkenhead in 1868 and "reconstructed" in 1895. The King of Italy's "Trinacria" is a screw steamer. She was originally, if my memory serves, the liner "America," and was built at Clydebank in 1884. The Spanish royal yacht "Girelda" is a twin-screw vessel, and was built in the early nineties by the Fairfield Company for Harry McCalmont. The Kaiser's "Hohenzollern" is naturally German built, but his navy can boast of at least three Clyde-built yachts. These are the old steamer "Mohican," now known as the "Lorely"; the America Cup challenger "Thistle," now known as the "Comet"; and the second "Meteor," now known as the "Orion."



A British cylindrical tank ship at the yards of William Doxford & Sons.

CALIFORNIA LAUREL FOR THE U. S. NAVY

The United States Navy Department called for October bids for a quantity of California laurel to be delivered to Mare Island. The specifications call for heavy plank 5½″ to 10½″ in thickness, 14″ to 16″ wide, 10′ to 18′ long. This lumber is to be used for shaft logs in the construction of a number of boats which are being built at the present time at Mare Island. Since the latest logging methods have rendered the supply of California laurel stable and plentiful this cheap and excellent hardwood is being used to a much greater extent than ever before. It replaces with perfect satisfaction the more expensive oaks and ironbarks.

The Canadian Pacific steamers "Empress of Asia," "Empress of Russia" and "Empress of Japan," according to Montreal despatches, have been released by the British Admiralty and are now being refitted to resume their old service on the Pacific.

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Pacific Coast Shipping Notes

SAN FRANCISCO.

As an indication of the rapid transfers taking place in shipping property the case of the "Mazatlan" is of interest. The vessel was tied up in a Mexican port, was sold to Flood Brothers for $115,000 who paid, it is said, a heavy fine and landed her in San Francisco at a cost of about $20,000, sold her to Sudden & Christenson for a rumored price of $150,000, who in turn disposed of the vessel to Norwegian owners for $180,000. The "Mazatlan," formerly the "Jason," was built in 1903 and is 267′ by 37.4′ by 19.8′ of 1783 gross tons and is driven by a triple expansion engine with cylinders 19½″-31″-51″ in diameter by 33″ stroke.

The old whaling ship "Jeannette" was recently sold to Roth & Blum and it is rumored that her eventual destination is to be a studio for staging moving picture frame ups.

The raise of 50 cents in the lumber rates from northern points can hardly be called startling as conditions have been ripe for such an advance for some time. Atlantic coast or foreign trading has claimed over thirty-five vessels formerly engaged in the coastwise lumber trade whenever conditions warranted their use. It is not unlikely that there will be a further advance in lumber tariffs.

The Crowley Launch and Tug Boat Company has secured the contract for transporting 350,000 tons of rock from Santa Catalina to the breakwater at Fisherman's harbor, San Pedro.

Waterfront work at Richmond is still showing great activity. The Healy-Tibbitts Construction Company has the 700-foot municipal concrete pile wharf well along, and the belt railroad project is being rapidly whipped into shape.

The Union Oil Company has disposed of the tanker "Roma" to the West India Sugar Company. The Roma was built in 1889 and is 316′ 0″ by 40′ 6″ by 20′ 8″ in dimensions. She is driven by a three-cylinder triple expansion engine 23½″, 38″, 62″ by 42″, steam being supplied by two Scotch boilers.

The directors of the Pacific Mail Steamship Company have declared a distribution of $25 a share, payable December 15 to stockholders of record December 4.

The Luckenbach Steamship Company recently contracted with the Fore River Shipbuilding Corporation for a second 10,000-ton freighter. The Luckenbach Company now has three large steamers building, two at the Fore River plant and one at Newport News.

The "Santa Barbara," the latest vessel for the Atlantic and Pacific Steamship Company, W. R. Grace and Company agents, left the ways at Cramp's during the past month. The "Santa Barbara" is 420 by 54 by 36.9 feet and is the first of three similar vessels building at Cramp's for the same concern.

With the passing of the Pacific Mail Steamship Company's agency at Acapulco, many changes are taking place. The Pacific Mail agency was the chief factor in the commercial life of the town, as the company maintained a large supply of coal, owned its own wells and operated a water boat, warehouse, workshop, two tugs and a fleet of lighters. The wells and water boat have been purchased by the firm of Hudson and Billings, who will continue to supply water to visiitng vessels, while the Compania de Alijos de Acapulco, Sociedad Cooperativa, will probably buy the rest of the property and engage in the lighterage business. Three new companies have vessels now calling at Acapulco. The Mexican National Trading Company, a California corporation, has the "San Ramon" and "Fair Haven" plying between San Francisco and Salina Cruz for freight only. The South Sea Navigation Company has three vessels, "Fort Bragg," "Coaster" and "O. M. Clark" plying between San Francisco and Corinto, and the Northern Navigation, a British company, has the "Citriana" and the "British Empire" plying between San Francisco, Salina Cruz and way ports.

The Naval collier "Justin," formerly the British ship of the same name and built in 1891, is shortly to be sold at Mare Island.

The Luckenbach Steamship Company has leased

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the Hamburg American pier at the foot of Thirty-third street, Brooklyn, until the end of the war.

The North Pacific Steamship Company has purchased the steamer "Breakwater" from the Southern Pacific Company, to take the place of the lost "Santa Clara."

SEATTLE.

The former cannery steamer "Toledo" has been purchased by Mexican interests and is now operating on the Mexican coast.

The Pacific-Alaska Navigation Company has purchased the Great Lakes ore carriers "Rutland" and "Ogdensburg" of 1668 and 1673 net tons. These vessels are 242′ by 43′ by 26′ depth of hold and will carry 3000 tons deadweight. They will be used in the Alaska service, and will be rechristened "Admiral Clark" and "Admiral Sebree."

The fire at Pier 14, the Seattle terminal of the Blue Funnel line, destroyed freight to the value of over $1,000,000. The Blue Funnel line and the Border Line Transportation Company have made arrangements with the Seattle port authorities to use the new Smith's Cove pier until Pier 14 is rebuilt.

The recent mishap with the Hall Brothers Marine Railway fortunately turned out but a trivial delay in the docking of vessels. The "Northwestern" was being hauled out when the chain parted launching the vessel back into the harbor. Fortunately the vessel was uninjured and the damage to the dock platform was so slight that docking operations were resumed within a day or two. The loss of the dock, even temporarily, would have proven embarrassing as all the docking facilities on the Sound are being used practically to capacity.

The Alaska Steamship Company has been increasing its tonnage heavily of late. The purchase of the two Great Lake freighters "Burlington" and "Bennington," and of the "Kansas City" from the Union Iron Works is to be followed by the acquirement of a third Great Lakes boat some time during the winter. The "Kansas City" will be rechristened the "Alaska" while the "Burlington" and "Bennington" will appear as the "Juneau" and "Valdez." The "Kansas City" is of 3679 tons net, 327′ by 45′ by 18.8′ principal dimensions and built in 1889 at Chester, Pennsylvania. The "Burlington" and "Bennington" were built for the Rutland Transit Company by the Great Lakes Engineering Works in 1908. They are 244′ by 43.2′ by 27′ in dimensions and are driven by quadruple expansion engines with cylinders 16¾-24-35 and 51 inches in diameter by 36 inches stroke.

The Kitsap County Transportation Company has sold its steamer "Kitsap" to the Kingston Transportation Company and in turn purchased the "Camano" from the same concern.

The "Miami," a large Puget Sound tug, was sunk at the dock of the Anderson shipyard on November 9 through being tied up at high tide with short mooring lines. When the tide receded the craft careened and filled with water.

The "Admiral Watson," which was sunk at the Bell-street pier on August 27 by the "Paraiso," was successfully raised during the early part of the month and taken to the plant of the Seattle Construction and Dry Dock Company, which concern carried on the work of salving the vessel under the directions of Captain S. B. Gibbs, representing the underwriters and Frank Walker, Marine Surveyor, representing the Admiral line. The job was a difficult one but was carried through without a hitch.

Wharfage charges by the Seattle port commission on traffic moving under joint transpacific tariffs with railroads will hereafter be on the basis of 20 cents per ton weight, boats, explosives, lumber and live stock excepted. The new tariff is for the purpose of facilitating joint through rate shipments. The Public Service Commission has also decided to discontinue charging for wharfage storage on transoceanic shipments.

Mr. R. Bisschop, manging director of the Java-China-Japan-Lijn, says that the new East Indies connection will be known as the "Java-Pacific line." The service will start with a vessel sailing from Batavia, Java, December 15, and leaving San Francisco about February 15 and to be followed by a vessel monthly. The first four vessels to be assigned to this new service will be the "Arakan," "Tjikembang," "Karimoen" and "Tjisondari," all fine new steamers.

PORTLAND

Mr. F. A. Ballin, naval architect, has been making a study of the Portland shipping situation with the result that he foresees splendid opportunities for a steamship line operating between Portland and South America, return cargoes consisting mainly of nitrates.

The firm of Mitsui & Company, one of the foremost commercial, shipping, mining and banking houses of Japan, has taken out a certificate entitling the house to do business in the State of Oregon. The Mitsuis have had an agency in Portland for several years and Portland shippers are hoping that this latest move means the establishment of a regular service in place of the occasional sailings now in force.

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PERSONALS.

A. M. Garland, formerly freight traffic manager of the Pacific Mail Steamship Company, has been appointed general manager of the new China mail line and H. N. Thomas has been appointed general passenger agent, a position which he formerly held with the Pacific Mail Steamship Company.

R. N. Allen, an electrical engineer of Seattle, has been appointed efficiency engineer for the Seattle Port Commission.

W. C. Dawson, president of the Virginia Street Dock and Warehouse Company and one of the best-known shipping men in Seattle, has been appointed consul for Bolivia at that port.

S. M. Mears, president of the Port of Portland Commission, has resigned that position owing to the urgency of private business affairs. Mr. Mears' resignation takes effect December 10.

Messrs. Peterson and Schmiegelow, consulting engineers and Pacific Coast agents for the Tuxham semi-Diesel crude oil engine, have removed their offices from the Marvin Building, 24 California street, to a suite in the Insurance Exchange Building, 433 California street.

Word has come from Alaska of the death of Captain W. T. Brahh, formerly a well known sealing captain at the northwest sea ports.

Among the recent losses in the marine world, one felt very keenly on both sides of the Atlantic, was the death of Sir Thomas B. Bowring, senior director in one of the largest shipping and commercial houses in existence.

At the recent meeting of the Great Lakes Waterways Conference, Mr. A. A. Templeton of Detroit was elected president.

The death of Rear-Admiral Phelps early last month removed one of the best known Navy officers around San Francisco Bay. The long residence of the Admiral coupled with his ability to make and hold friends accounted for his wide popularity.

The Shipmasters' Association of America, headquarters in Seattle, will celebrate its first anniversary on December 16. The committee in charge of the celebration consists of Captain O. J. Humphrey of the Alaska Commercial Company; Captain Frank Worth and Captain Frank White of the Los Angeles Yacht Club, and W. T. Isted, a well-known Seattle insurance adjuster. Captain White is president of the Association.

Mr. Allen W. Marks, who for several years has handled York refrigerating machines on the Pacific Coast, is now connected with the Clothel Refrigerating Company of 90 West street, New York.

Freight Report

By PAGE BROTHERS.

San Francisco, November 19, 1915.

Our last review, dated October 20th, noted a lower level of freights in all the different markets, but the expected demand, and the expected advance in freights has come with a vengeance, as will be noticed in the review below.

From San Francisco, Westrope & Co. chartered steamer "M. S. Dollar" (which is now owned by parties in Japan or China) for barley to the West Coast of U. K. at 105/- via Panama Canal, or if around Magellan, 117/6. Balfour, Guthrie & Co. reports the charter of the "General Faidherbe" to U. K. at 85/- for barley, but chartered some time back, and Strauss & Co. have taken the "Bonchamp" to load either at San Francisco or Portland or Puget Sound, orders when she is ready to sail from Chile, at 92/6, April 30th cancelling, and 95/- if she arrives in March.

From the North, quite an active business has resulted, which, of course, would have been triple in size had tonnage been obtainable. The steamer "Harewood," which we mentioned in our last review, as chartered by M. H. Houser at 100/-, was unfortunately for him, requisitioned by the British Admiralty, and she will now load lumber for U. K. Steamer "Hermes" was announced a few days after our review as having been chartered at 87/6 by Strauss & Co. some time previously. To-day, we understand she has refused 130/- for re-charter.

The following sailers have been chartered: "Elginshire" 100/- by Balfour, Guthrie & Co., the "Rene" re-chartered by Strauss & Co. at 100/-, "Inverlogie" 80/- by M. H. Houser for May-June loading next year, "Musselcrag" 92/6 if March arrival, 90/- April 30, 1916, cancelling; "Eugene Schneider" 92/6 March arrival, 90/- April next, cancelling, by M. H. Houser, also "Kinpurney" at 92/6, and the "Lafontaine" for distant loading at 87/6. Kerr, Gifford & Co. have chartered steamer "Errol," on private terms, from Columbia River to U. K., and have also the distinction of having paid the highest freight on record for a steamer from this coast to U. K., they having chartered the steamer "Pacific" ex "Annette Rolph," from G. W. McNear, Inc., agents for the new owners, at $31.50 per ton, for a full cargo of flour, to be loaded at Puget

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Sound, and we expect to see even this rate eclipsed before many weeks, owing to the scarcity of steamers for early loading.

In connection with high charters, we may also mention a very high rate for time charters just made in the re-charter of steamer "Nissei Maru" by Comyn, Mackall & Co. to Dupont Powder Co. at 17/6 on the dead-weight, for about eight months, delivery Portland and re-delivery Seattle. The Osaka Shosen Kaisha have chartered the steamer "Kumi Maru," delivery and re-delivery Japan for one year, to trade with Puget Sound, for about 12/6. Steamer "Camino" was chartered by Swayne & Hoyt to Barber & Co., New York, at $20,000 a month, Government Form, charterers having the option of buying the steamer during the life of the charter, at $450,000 gold. Charterers took delivery of the boat at Cristobal, where she had been tied up with a cargo of coal for this Coast, and which she sold to the Government there, and sent the vessel to New York to load where she was docked, and Swayne & Hoyt were immediately notified that Barber & Co. had elected to buy her, and, naturally, all the stockholders in the company were very well pleased.

W. R. Grace & Co. chartered steam schooner "Falcon" for a round trip to the West Coast of South America, on private terms. Mitsui & Co. re-chartered steamer "Nichiyo Maru," now here, for delivery at Puget Sound and re-delivery at West Coast nitrate port to Grace & Co., also on private terms, and they have since chartered her to load nitrate from Chile to Vladivostok at 85/-.

Slade Lumber Co. have chartered steamer "Fair Oaks" on private terms to carry lumber from North Pacific to Callao. The rates to the West Coast are $20.00 per thousand feet, though we cannot say at what price the "Fair Oaks" was chartered.

For Australia, the American Trading Co. have chartered "Jane L. Stanford" and "Watson A. West" with cargoes of lumber attached, on private terms, to Sydney or Melbourne. J. W. Vance & Co. chartered "Retriever" from San Francisco to Melbourne at 100/-. The American Trading Co. have also chartered the new motor boat to be built by C. R. McCormick & Co. at St. Helens for next June loading at 90/- to Sydney, 100/- to Melbourne, Adelaide or Port Pirie, and 110/- to Fremantle. The owners of the vessel also supply the cargo for the ship. J. J. Moore & Co. chartered the "James Tuft" for distant loading, after her return from a trip to Africa, which she is now just about making, at 92/6 Sydney, 102/6 Melbourne, with probably options of loading at San Francisco with redwood, based on the fir capacity of the vessel. The Pacific Export Lumber Co. have chartered the "J. W. Clise" for early next year loading at 95/- to a New Zealand port or to Sydney; and Comyn, Mackall & Co. the "Encore" at 90/- Sydney and 92/6 New Zealand, cancelling December 31, 1916. It is reported that they have also chartered four or five more, but the rates on these are not yet out.

The only transaction for Africa has been the charter of the barkentine "Hawaii," from the North Pacific to a direct port on that continent, at 140/- by Hind, Rolph & Co.

For U. K., nothing has been done beyond the "Harewood" for account of the British Admiralty. It is reported that the British Admiralty need at least four or five more steamers to put in against purchases of lumber on this coast.

Since the purchase of the "Annette Rolph" by Mr. McNear for principals in Norway, the latter, inside of a week, resold her to the well-known owners of the "Christian Bors" and that line of steamers, for $800,000, and Captain Hille, one of the best known skippers on this coast, formerly on the "Christian Bors," will now be the proud captain of the new steamer. She will, of course, have to sail under the Norwegian flag now.

The owner of the steamer "Eurania" is now here making some very important changes in the bridge of this steamer, to make her suitable for the trade in which he will use her on the East Coast of the United States. We expect to see her get the banner freight for 1915, as the owner understands his business, and feels that he has the only ready steamer on this Coast.

Comyn, Mackall & Co. have taken a new departure in that they have bought the controlling interest in the steam schooner "St. Helens" for $168,000; and the North Pacific Steamship Co. have bought the "Breakwater" at about $90,000, it is said, after she is repaired by the present owners, to take the place of the ill-fated "Santa Clara." The Robert Dollar Co. have bought one of the Burrell steamers, "Strathardle," built in 1910, for the present needs of their business, and to replace the "M. S. Dollar." The reported purchase price is said to be £100,000, or possibly a small advance.

San Francisco, November 11, 1915.

Publisher, "Pacific Marine Review,"
24 California Street,
San Francisco, California.

Dear Sir:

I have read with much interest a number of your published articles in criticism of the "Seamen's Bill," so-called, and have been surprised that so little attention has been given to the immorality that underlies the main purpose of that Act; that is, its purpose to induce a class of men, without just cause, to break contracts that deliberately and without compulsion have been entered into by them; this, too, when the Acts of Congress, or the maritime law, give to the other parties to such contracts no such

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right. The United States, by its Constitution, expressly inhibits any State from enacting any law that shall impair a contract obligation; thereby giving its sanction to the moral duty that underlies a voluntary contract; and yet the United States, itself, has deliberately enacted the Seamen's Bill, the main, avowed purpose of which is to induce seamen to break their voluntary contracts, and release them from any liability for so doing.

In the absence of the concrete fact, it would be impossible to believe that a purpose which so shocks the ordinary moral sense could secure Congressional approval, or that of a President who, in other matters, so much relies on the moral code.

Yours truly,

GEORGE W. TOWLE.

HILL, HUBBELL & CO. HANDLING BIG WORK.

The firm of Hill, Hubbell & Co., representatives of Wailes, Dove & Co.'s bitumastic, have recently undertaken some very large contracts, but none of greater interest than the coating of the new 170-mile shell oil pipe line from the Coalinga fields to Martinez. This work included taking full charge of the pipe after it was screwed, cleaning, coating and enameling it, lowering it into the trench and doing the back-fill. The job being of sufficient magnitude, Hill, Hubbell & Co. got out some ingenious machines for use on the work. The machine for applying the priming coat travels on wheels on the pipe line and has a rotating brush and scraper on the front end for removing mill scale and on back the rotating brushes for applying the priming material. This machine is driven by a 6-horsepower gas engine. A second machine quite similar to the first follows and applies the bituminous enamel coating to a thickness of about one-eighth inch, this enamel, of course, being applied in a melted state. A tripod lowering device ingeniously arranged with wheels that do the double duty of winch wheels for lowering and transportation wheels when the device is being moved along, follows the enamel device, and this in turn is followed by a ditch back-filling machine fitted with a 40-horsepower automobile motor. Splendid results were obtained with all these devices despite the fact that most of the route proved exceedingly heavy going for the transportation vehicles, one section being in sand and most of the remainder in black adobe.

"ACT OF GOD."

It will be recalled that in August, 1912, the steamer "Newport" was sunk while lying at the wharf at Balboa.

It appeared that during the night the lower ends of the piling supporting the wharf slid outward, causing the wharf to sag, and two heavy cranes which were on the wharf fell across the "Newport," causing her to list until she filled with water and sank. After a long series of operations the steamer was raised and returned to San Francisco, where she was repaired. The cargo was practically a total loss.

During the investigation which followed it developed that at previous times during dredging operations in the approach to the Panama canal other portions of this wharf had been disturbed, presumably by the bottom sliding away on account of the operations of the dredgers, thus removing a part of the support of the piling, and these disturbances had been corrected by reinforcing and bracing the piling.

Ship and cargo owners and underwriters united in a suit against the Panama Railroad Co., owners of the wharf, for damages, aggregating some $800,000, on the grounds, in part, that the Panama Railroad Co. was aware of the existing conditions and that it was negligent in not reinforcing the supporting piling and thus avert the danger of a collapse.

Judge Hough, of the Federal Court in New



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York, has handed down a decision holding the Railroad Company free of blame and holding, the collapse of the wharf, according to the dispatches, as an act of God. The text of the decision is not, at this writing, at hand, but it probably holds that the weakening of the support of the piling was due to natural causes and not to the operations of the dredgers.

TEST OF POPPET VALVE ENGINE.

Many engineers are still skeptical of the economies claimed for poppet valve engines as compared to the standard Corliss engines. The best argument to disprove this, aside from the actual test figures, is the fact that engine builders themselves have found a constantly smaller market for the Corliss engine and an astonishingly wide market for high speed poppet valve engines. The Nordberg Manufacturing Company builds poppet, four-valve or counterflow engines and poppet valve uniflow engines. For non-condensing work they recommend the four-valve engine, for condensing service the poppet valve uniflow engine, in which expansion down to 26 inches vacuum is carried out in one cylinder at high efficiency.

Recently an acceptance test was made of a 15 x 18″ type "S" Nordberg Poppet Valve Non-Condensing Engine for driving a positive displacement blower.

Power was measured by a Prony brake. Special precaution was taken in measuring condensate. Ample condenser surface was used to insure a reduction in water temperature from 212° down to room temperature so that there was no loss of vapor from the weighing tanks. Pressures and temperatures were taken by standard calibrated instruments and speed was read by a tachometer and also a totaling revolution recorder. Indicator cards were taken at regular intervals of ten minutes by Ashcroft indicators with calibrated 100 pound springs. Typical cards are shown in Figures 2 and 3 which are unretouched photographs of cards at 31.7, 60.7, 82 and 92.7 pounds





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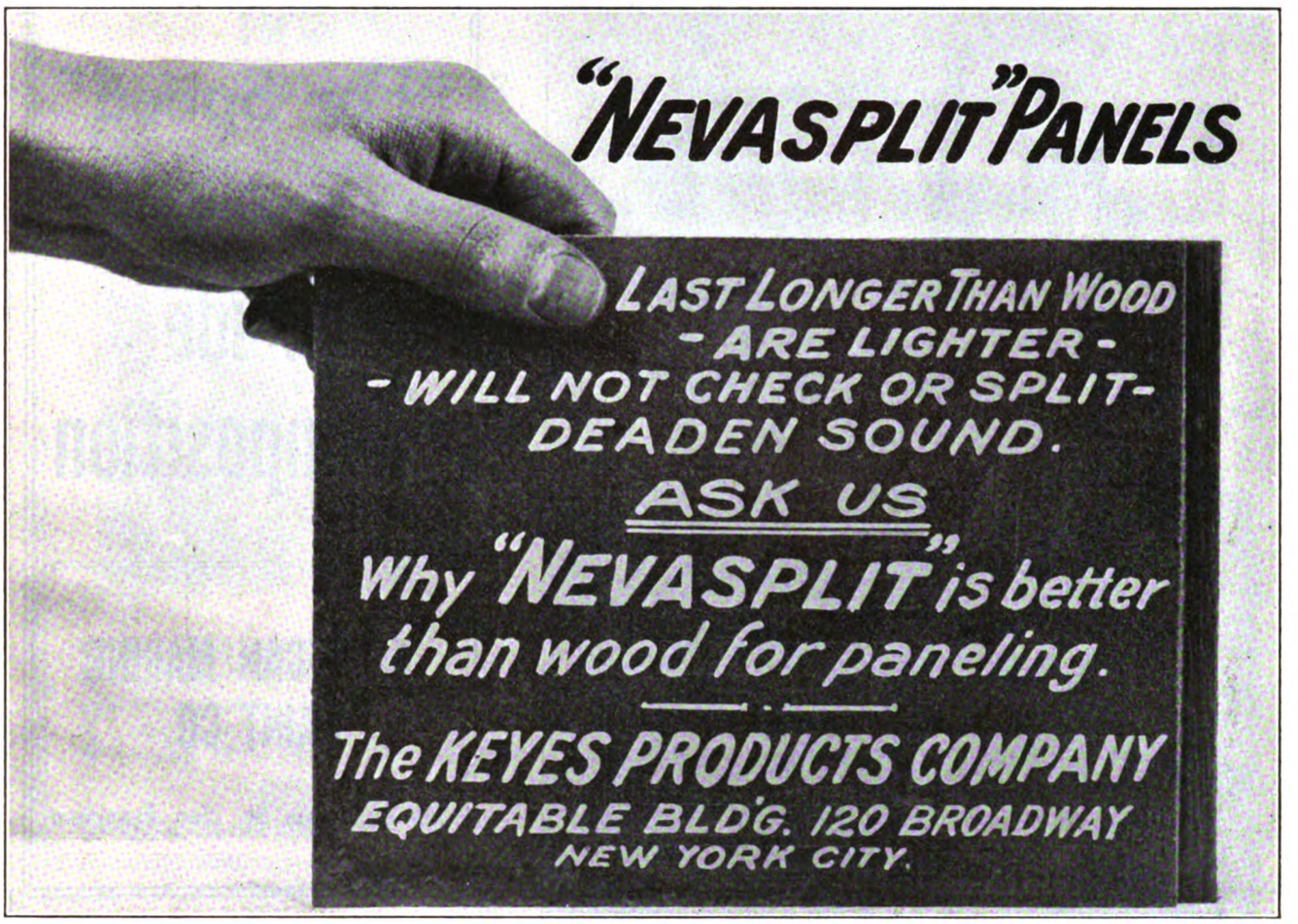
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M.E.P. Attention is drawn to the fact that the steam line holds up horizontally and to the unusually well defined cut-off obtained. These cards are remarkable for an engine running at 200 r.p.m. with non-releasing gear, and show conclusively the excellence of the poppet valve and gear design.

Table 1 shows the results of the acceptance test at approximately 200, 150 and 100 HP. loads and 200 revolutions.

At best load the steam consumption of 18.85 pounds per indicated horsepower corresponds to an efficiency, referred to Rankine cycle, of 79.9%, a remarkably high result for 130 pounds steam containing about 1% moisture. The total water measured was corrected for this moisture and the steam rate is given on the customary basis of dry steam. Moisture in steam greatly aggravates cylinder condensation and when superheats of 100 to 150° are used, the Rankine efficiencies rise above 80%.

On the basis of brake horsepower, the Rankine efficiency is 72.6%, the difference being accounted for by the mechanical efficiency of the engines, which is 91%. In an engine of so small a size, namely 150 HP., and operating with wet steam at low pressure an efficiency of 72% on a brake horsepower basis is unusually high. These efficiences are based on steam rates which include the steam condensed in the jacketed heads of the engine which amounted to about 3% of the total condensate.

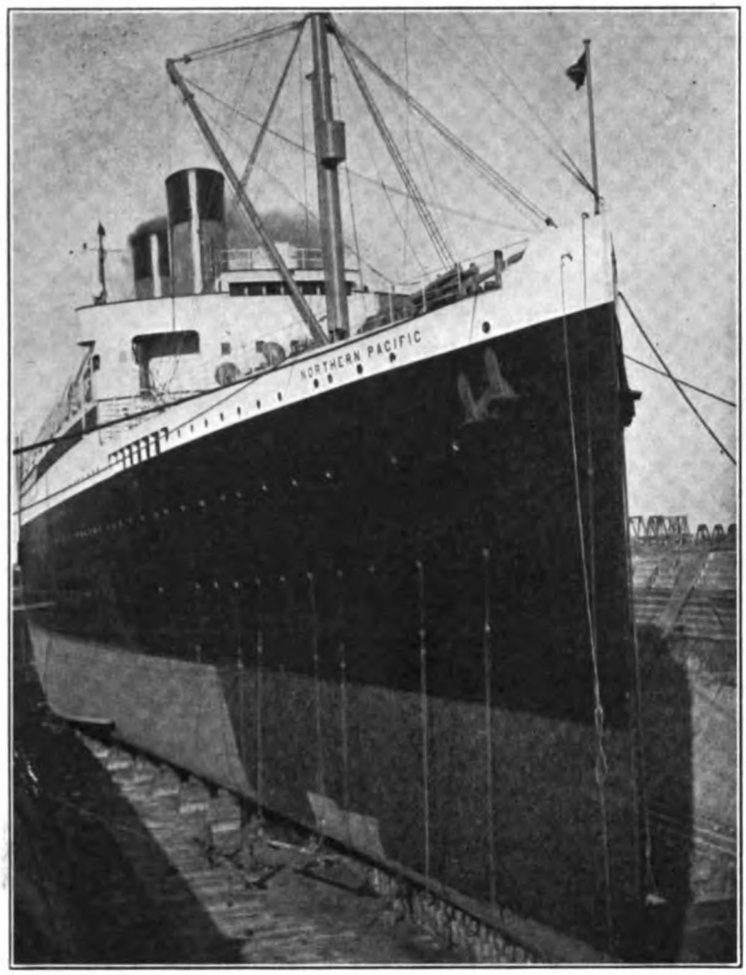
TABLE 1.

Results of Steam Consumption Test on 15" x 18" Nordberg Full Poppet Valve Engine—Non-Condensing, 200 R.P.M.

Duration of Test.	1 Hour	1 Hour	1 Hour
Average speed, R.P.M.....	199.71	200.3	200.4
Steam pressure, lbs. gauge....	130.0	130.03	130.8
Average back pressure, lbs. gauge	0.24	0.19	0.19
Quality of steam.....	.986	.99	.987
Average brake load, B.H.P...	185.8	150.0	111.8
Average M.E.P.. lbs. sq. in...	62.58	50.83	39.0
Average indicated HP., I.H.P.	197.	160.1	123.0
Mechanical efficiency.....	.94	.937	.908
Water measured in condenser, lbs. hour.....4125.5		3211.	2287.
Water condensed in cylinder head, lb. hour.....	79.	49.	61.
Total water condensed, lbs. hour 4204.5		3260.	2348.
Dry steam admitted to engine, lbs. hour .....4150.		3225.	2320.
Steam Consumption—			
Lbs. per B.H.P. hour.....	22.32	21.48	20.75
Lbs. per I.H.P. hour.....	21.05	20.15	18.85

The Briggs Bituminous Composition Company has secured the contract for coating the interior and part of the exterior of a large pontoon now being constructed by the American Bridge Company, Ambridge, Pennsylvania, for the U. S. Government. This pontoon will be sent to Pensacola, Florida, and used as a floating hangar for dirigibles.

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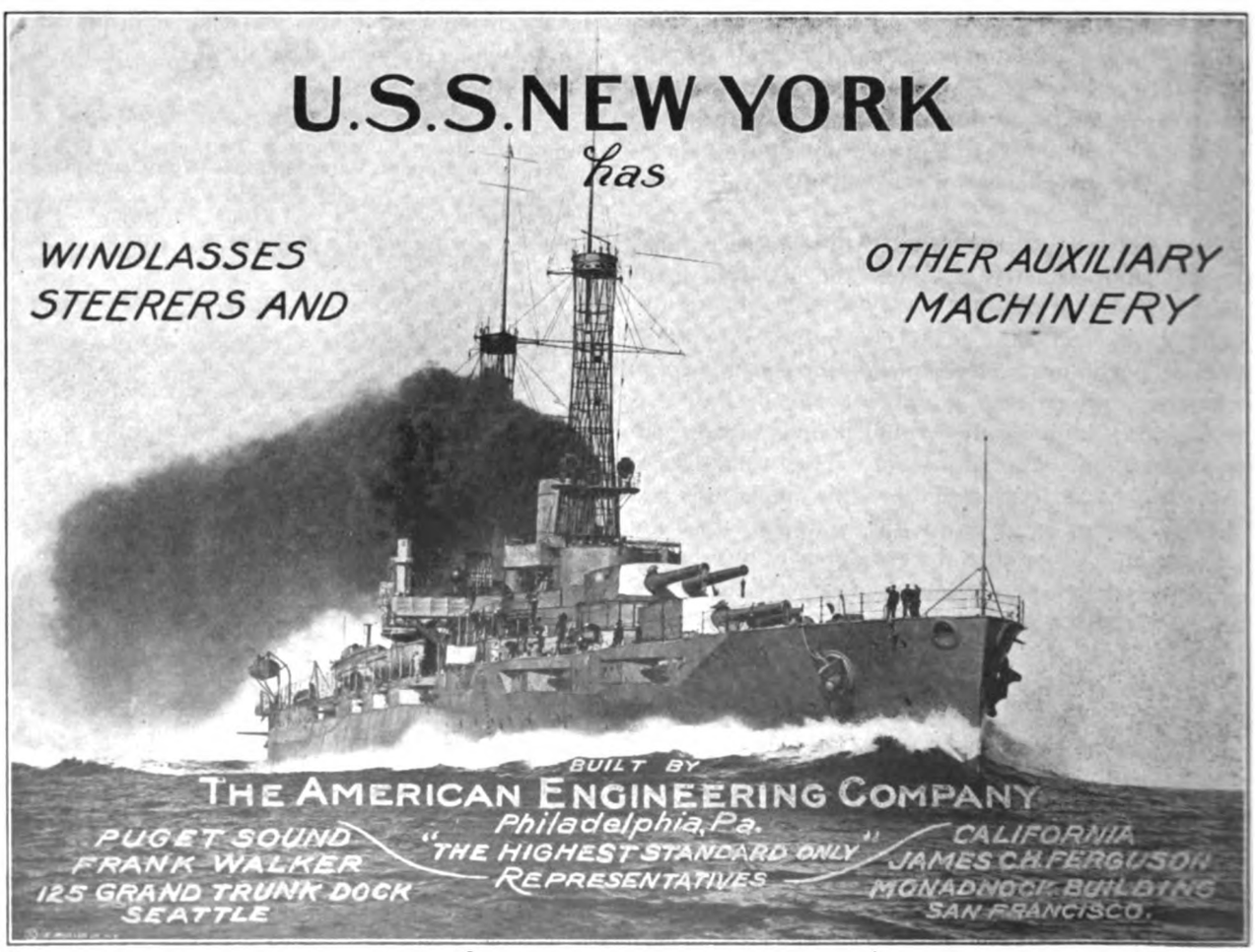


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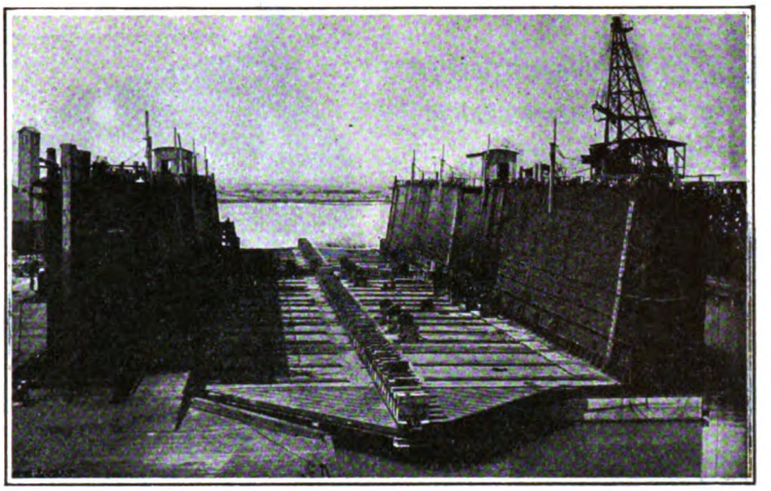
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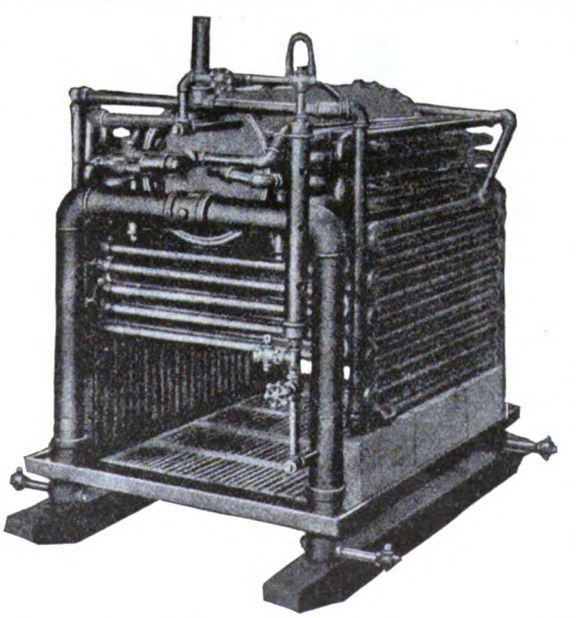
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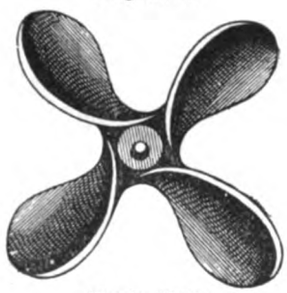
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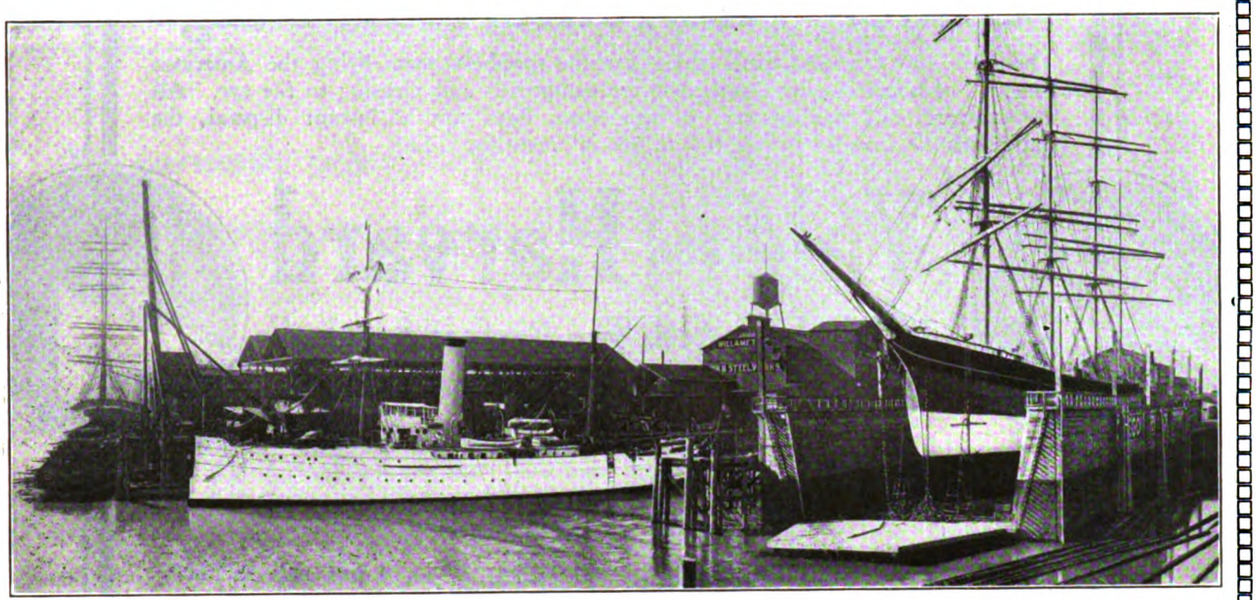
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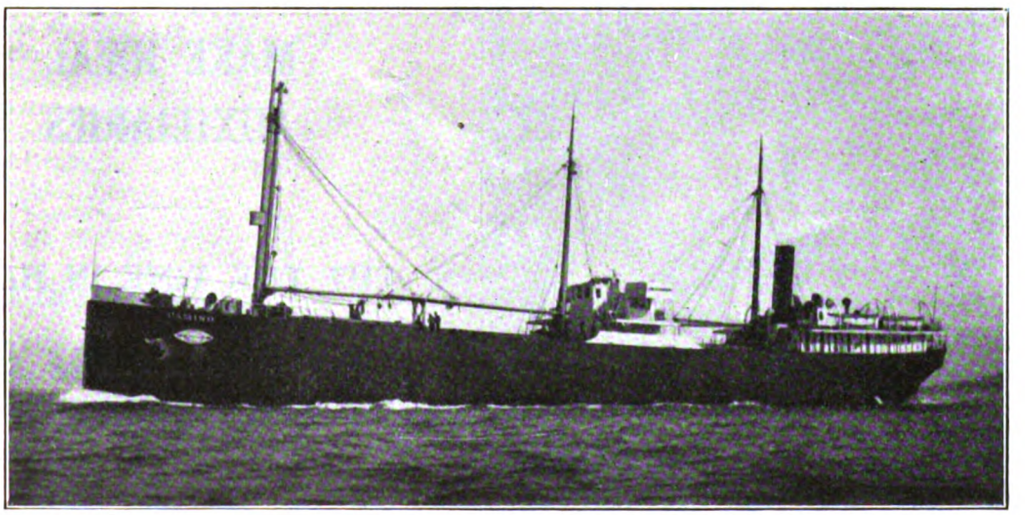
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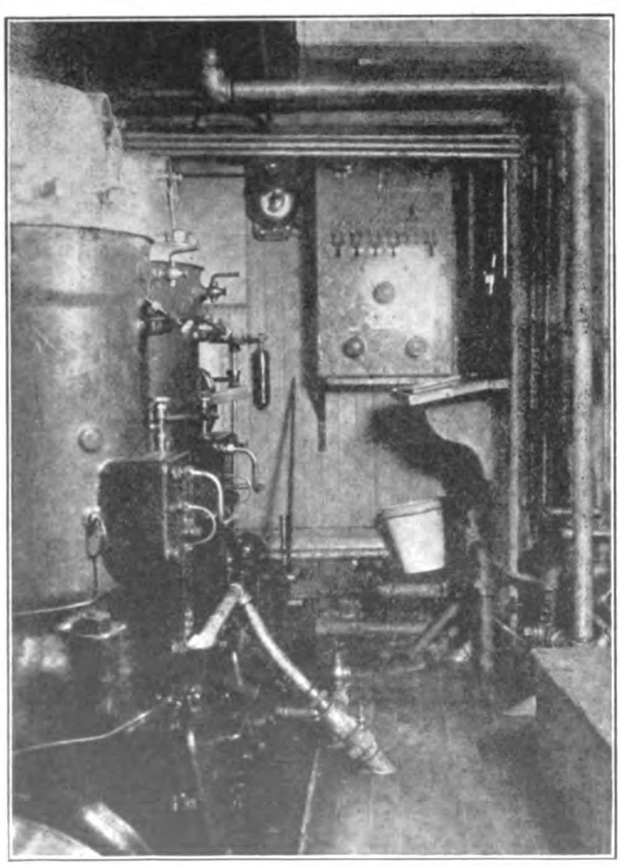
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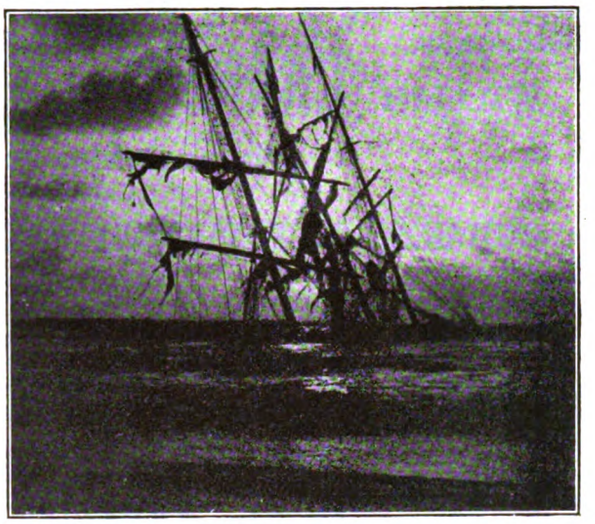
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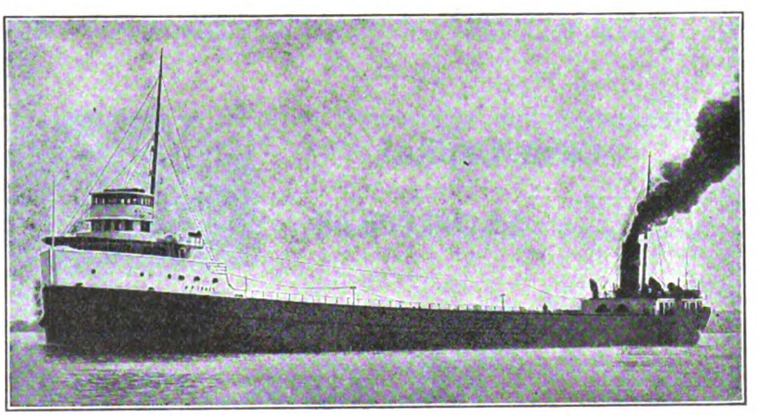
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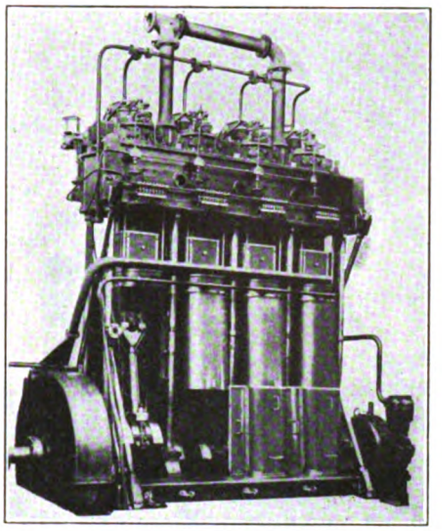
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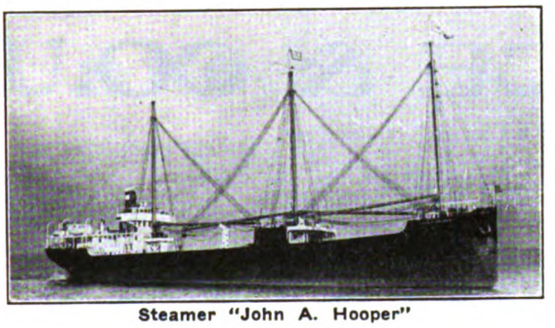
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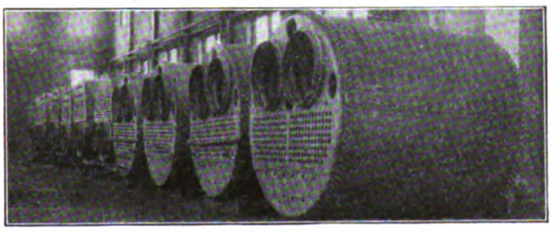
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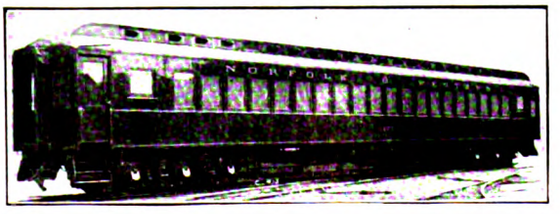
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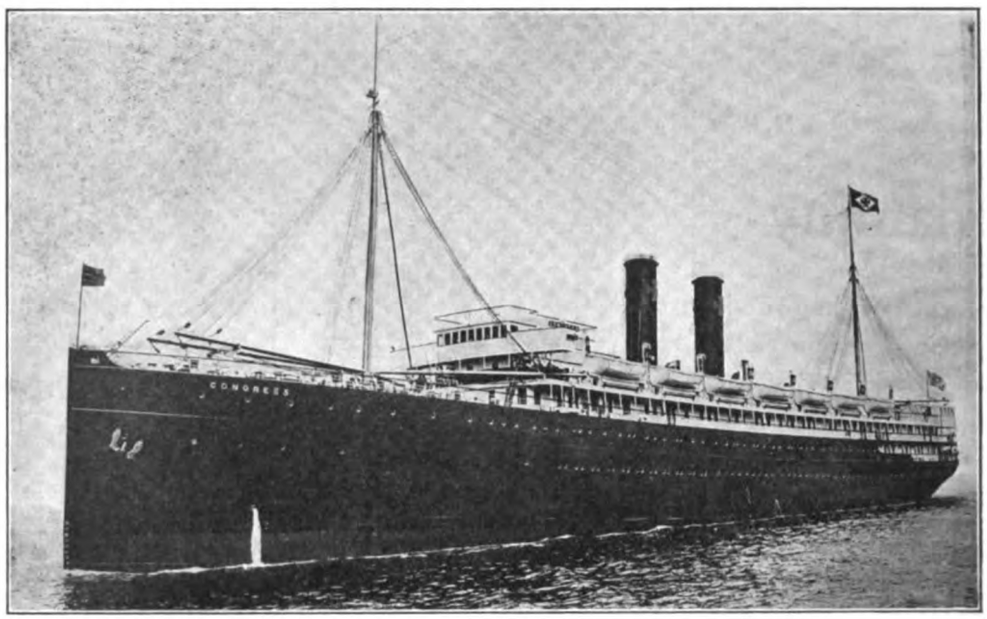
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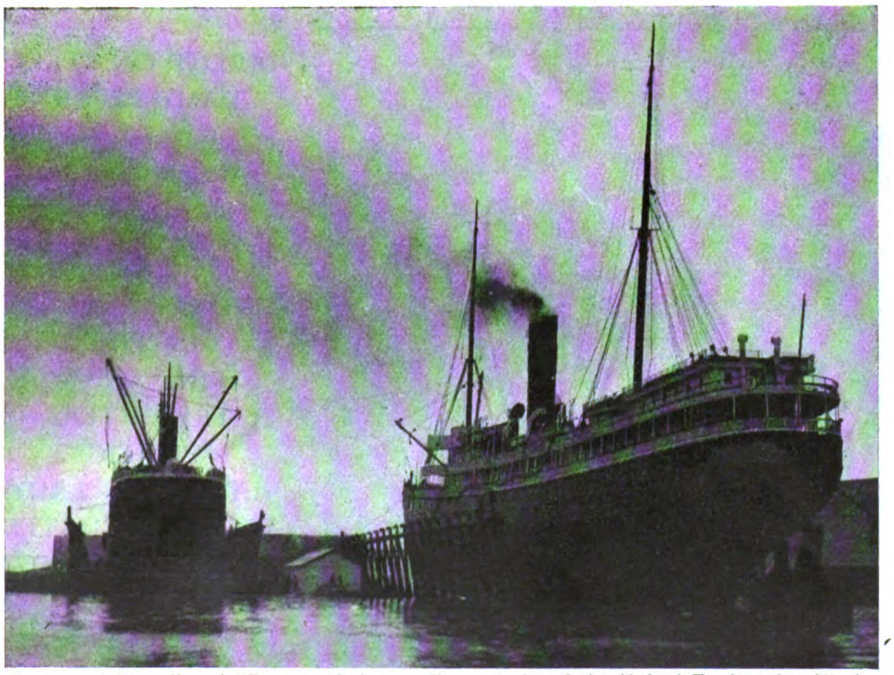
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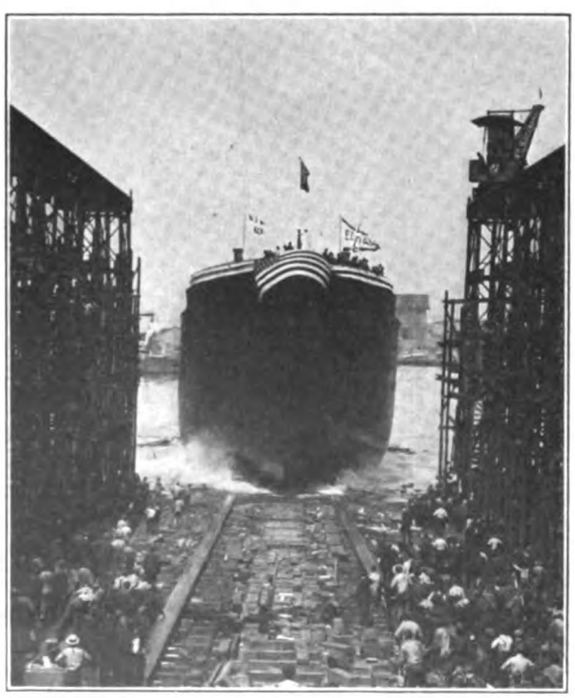
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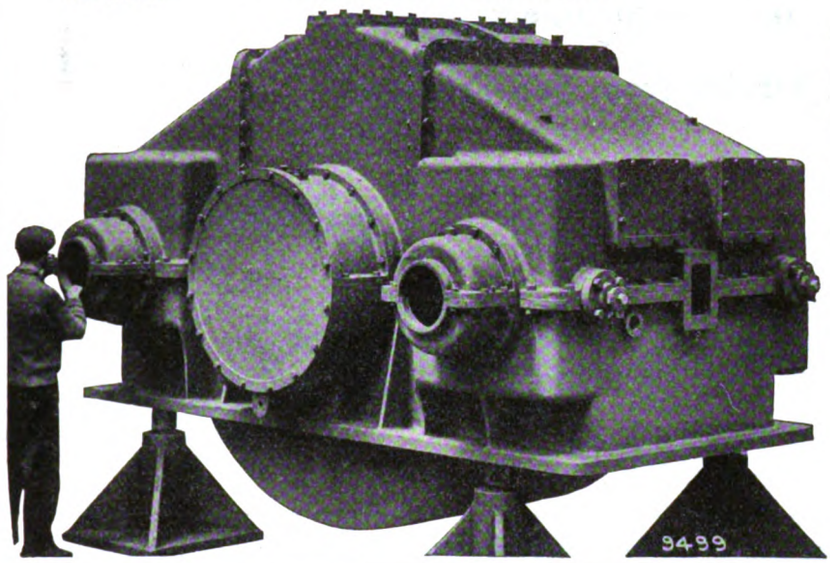
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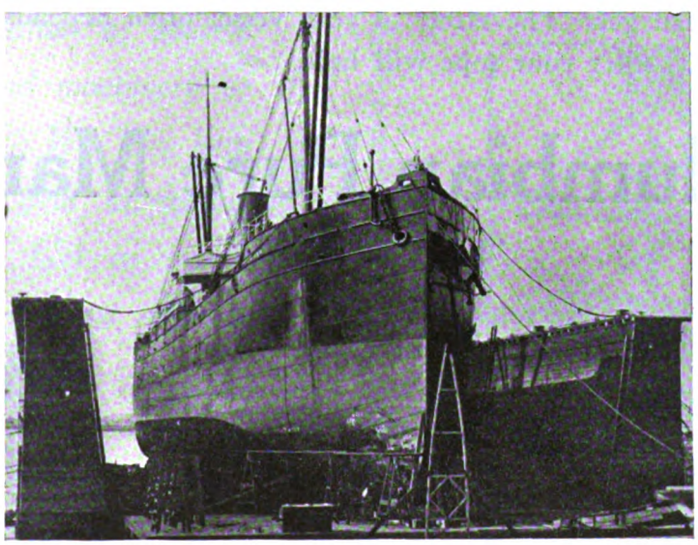
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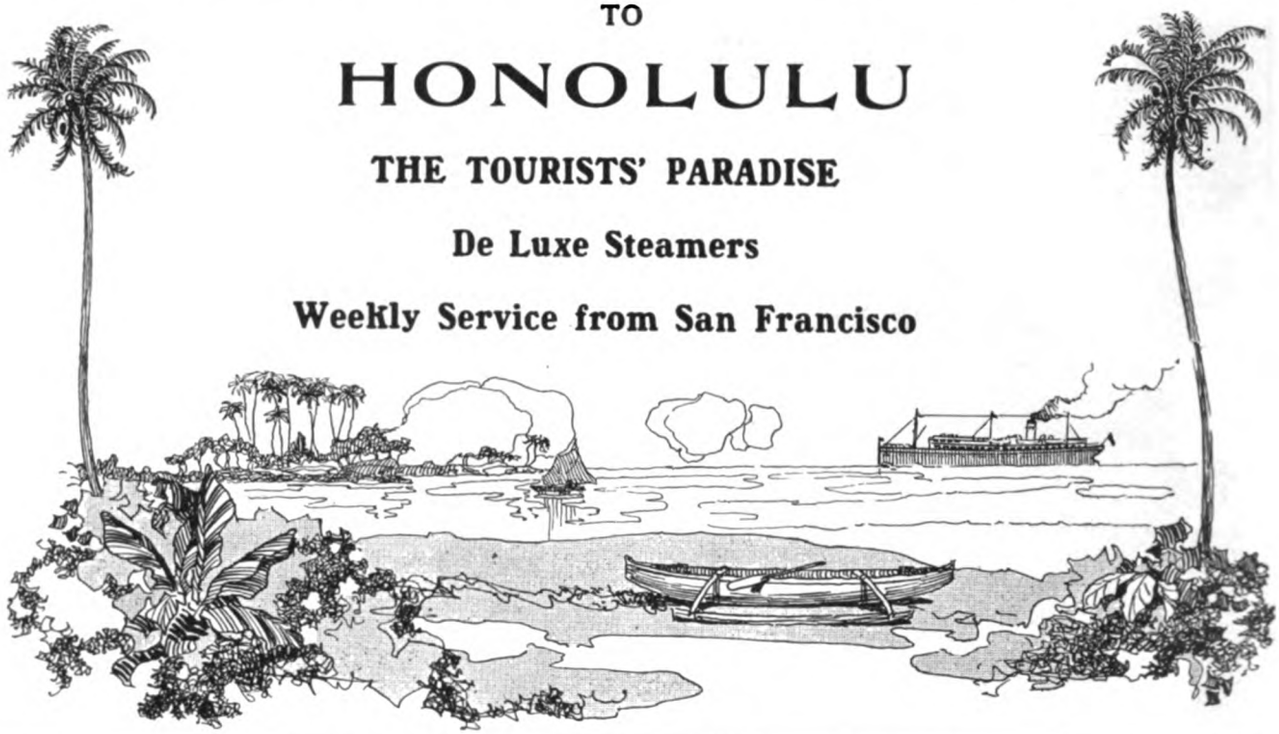
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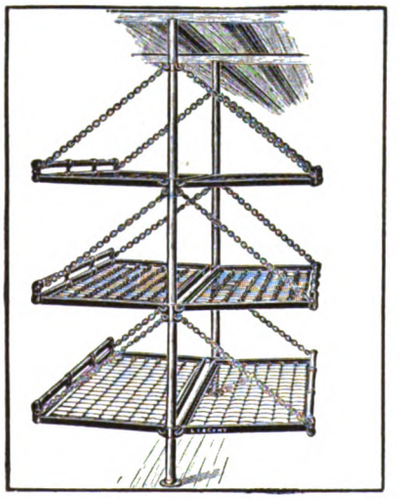
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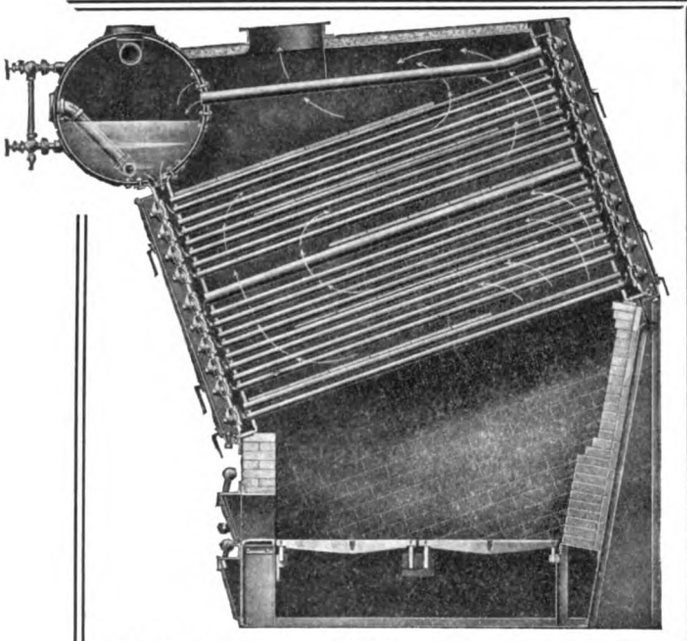
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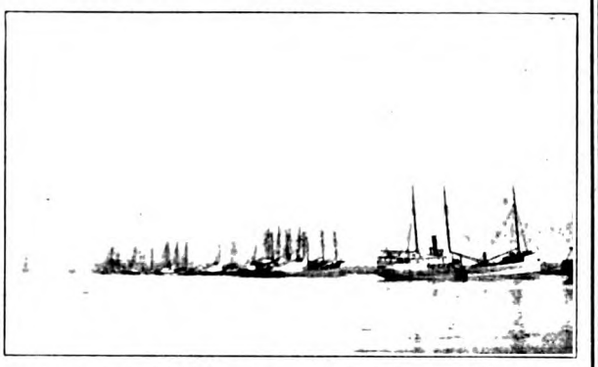
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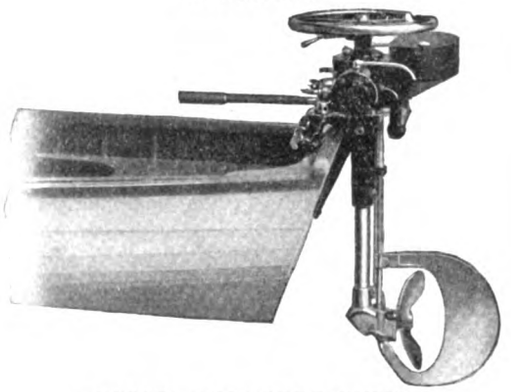
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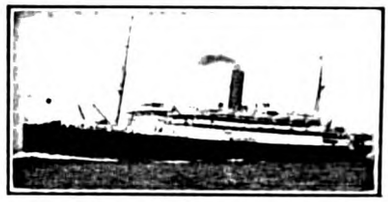
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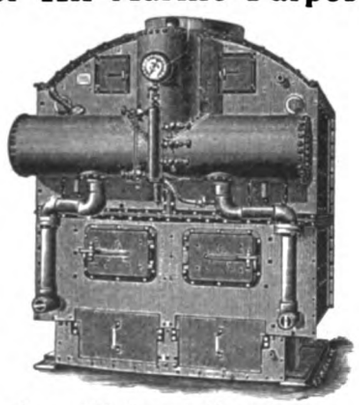
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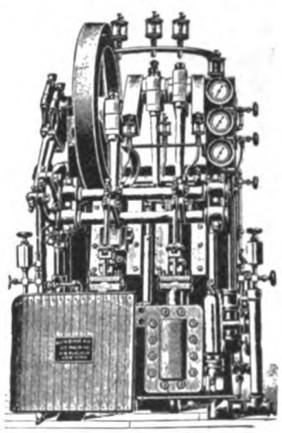
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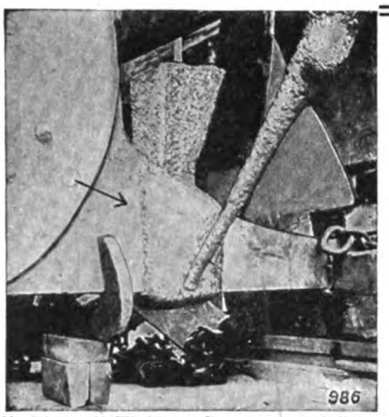
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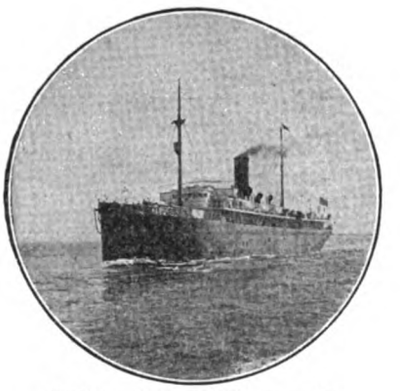
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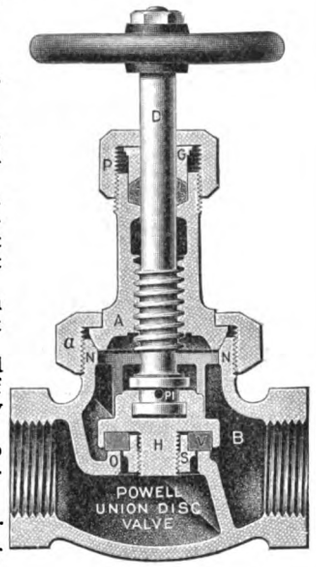
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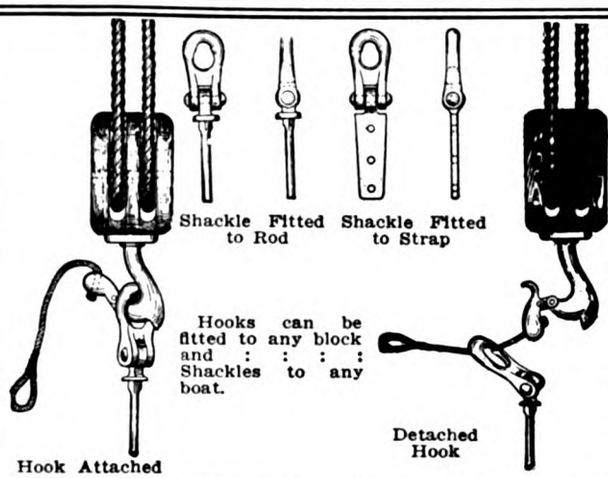
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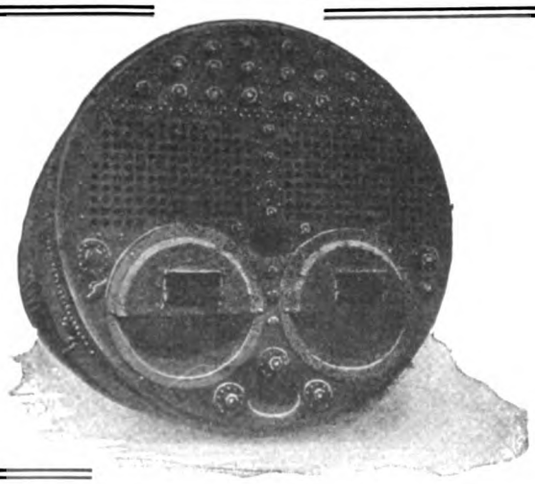
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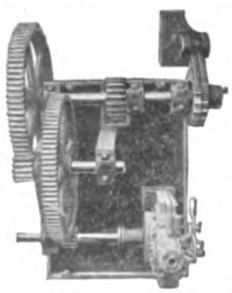
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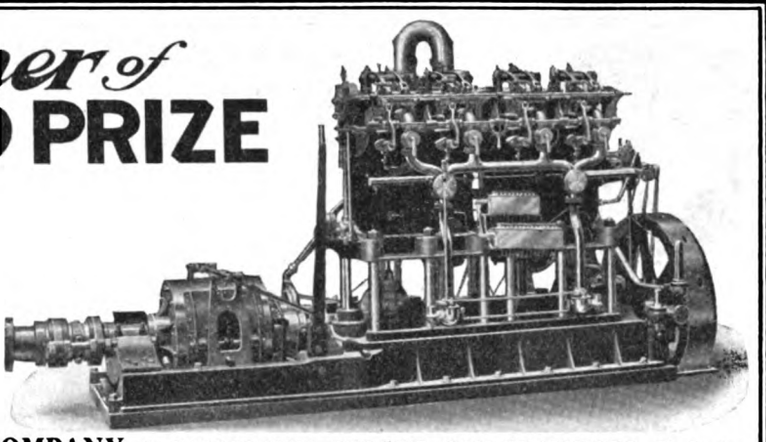
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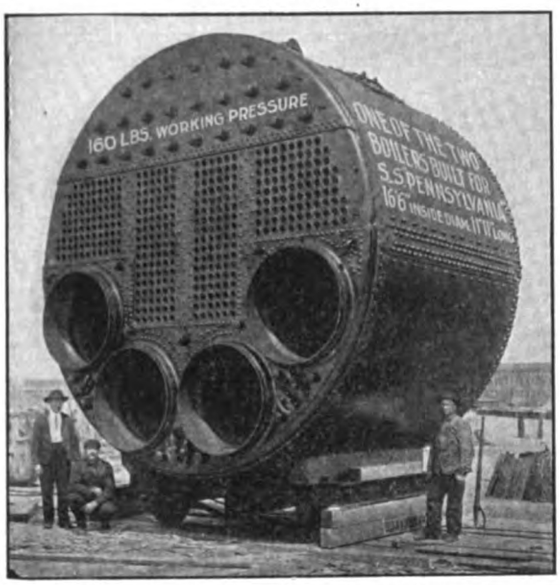
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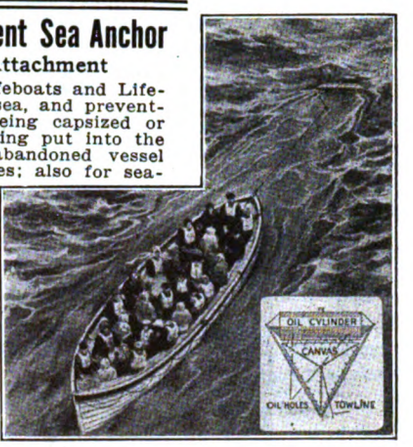
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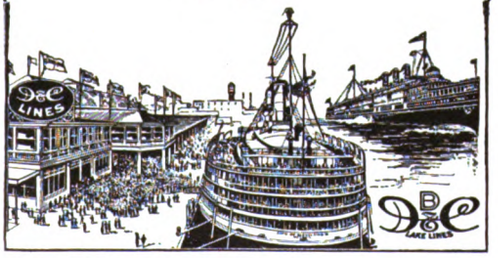
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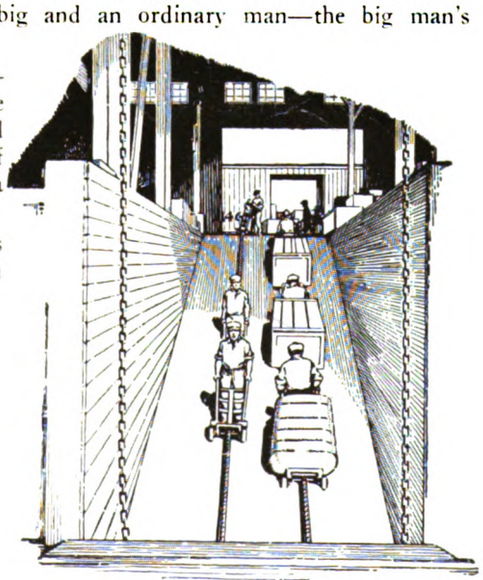
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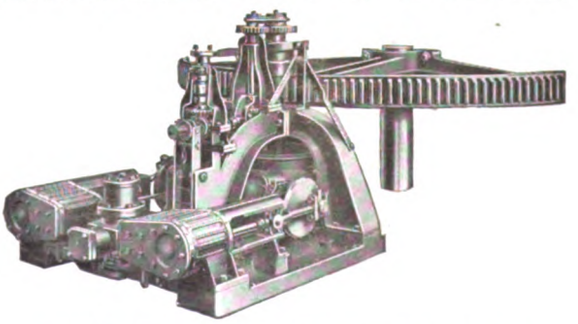
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